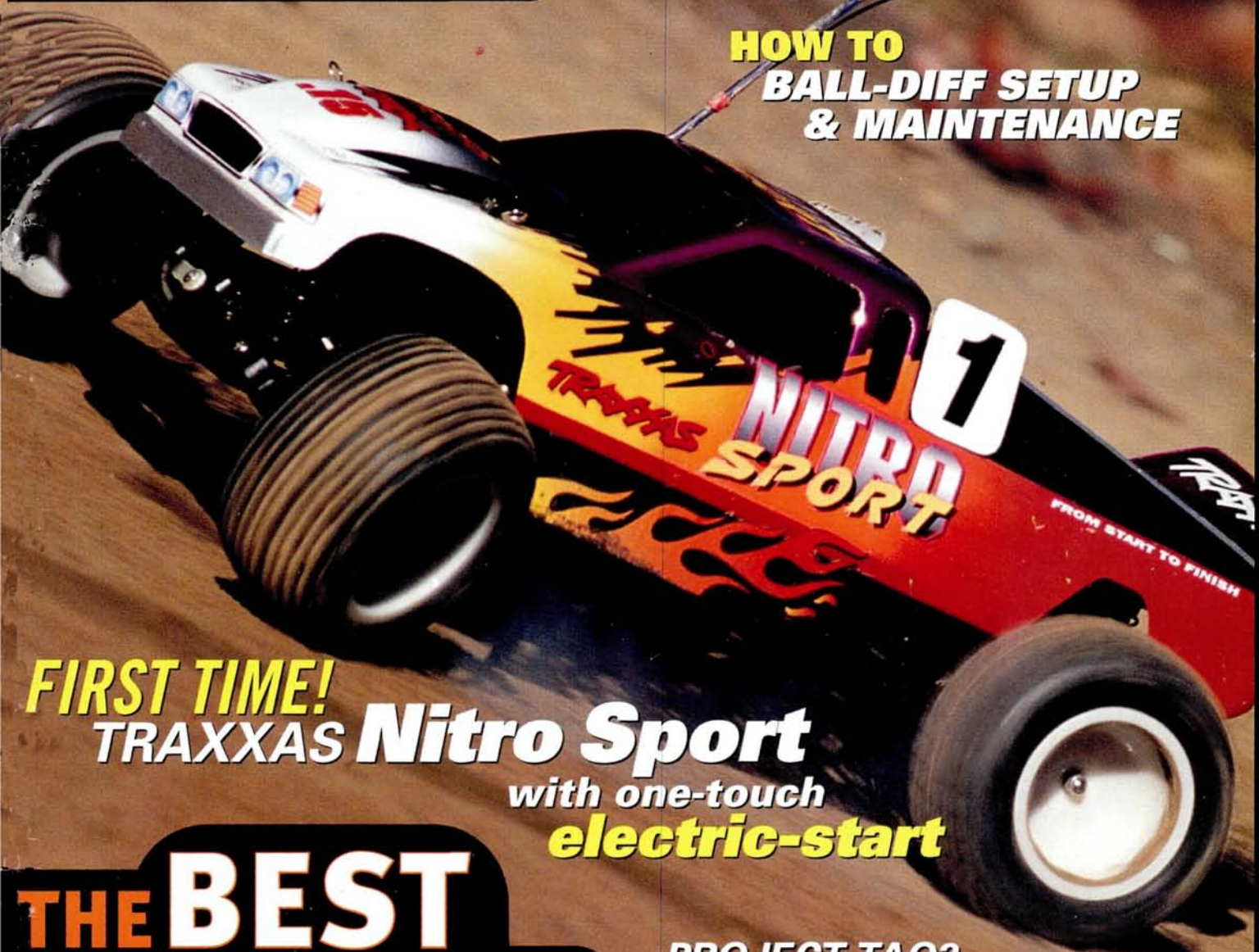




CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

February 1998



**HOW TO
BALL-DIFF SETUP
& MAINTENANCE**

FIRST TIME!
TRAXXAS Nitro Sport
with one-touch
electric-start

**THE BEST
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**PROJECT TAO3—
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Learn about
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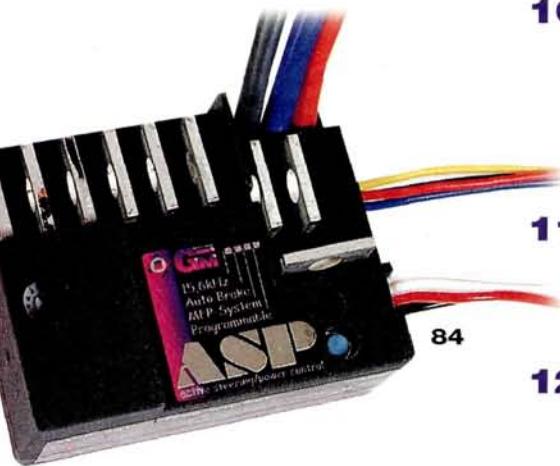
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ON THE COVER (top to bottom): MRC Hammerhead; Traxxas Nitro Sport; Novak Racer EX ESC; Hector Aponte's Mongoose monster truck (all photos by Walter Sidas).

ON THIS PAGE (top to bottom): Mongoose monster truck; GM ASP speed control; Traxxas Nitro Sport; Megatech Alfa Nitro touring sedan (all photos by Walter Sidas).

Decisions, decisions...

When considering just about any buying decision in R/C, it can be hard to make up your mind. There's just so much good stuff out there that you practically need your own research team to supply the pertinent data before you can plunk down your hard-earned cash with total confidence. If you're shopping for an ESC, you really have your work cut out for you! Don't fret. For this issue, we've gathered the hottest forward-plus-brake ESCs, compiled their facts and features, and added some in-depth, how-it-works-and-why-it-can-help-you information. We've even spoken to the geniuses that make 'em tick! Read the six fact-packed pages of our "Racing ESC Guide" and you'll be able to pick the perfect ESC for your budget and application.

From Shopping Cart to Monster Truck



Guys like Hector Aponte and his home-built Mongoose monster truck really bug me. I take the time to build my car with anodized screws, convince Greg Vogel to paint the body, neatly wire all my electronics and Armor All my tires so I can have the hottest-looking car at the office. And what happens? Hector happens. This guy welds his own chassis out of a shopping cart. He builds a totally scale cockpit. He paints a pretty body—on his first try, no less. To top it all off,

the Mongoose actually works, and Hector races it! I'm left with blue screws and slippery tires, hatin' life.

Joking aside, Hector's homebuilt Mongoose is an R/C inspiration. I hope Hector's work will inspire more than a few of you to create your own custom machines! We're always interested in your homebuilt projects, so let us know what you're working on. You could have your own machine and smiling mug in the magazine just like Hector.

Speaking of cool custom jobs, you'll definitely want to check out the G-man's Project TA03. George's alumin-ized ride is the first in a series of "Project" TA03 cars we have in the works. If there's a project idea you'd like to see, be sure to send us your ideas! (*R/C Car Action*, Air Age Publishing, 100 East Ridge, Ridgefield, CT 06877-4606; fax [203] 431-3000; email peterv@airage.com).

Nitro Off-Road Racing Made Easy

Don't miss our "First Look" at the Traxxas Nitro Sport. As you can see from the photo on the cover, this truck is red hot! Smokin' looks aside, the electric-start Nitro Sport is probably the most user-friendly stadium truck on the market, and it's extremely affordable, too.

Naturally, we've also packed this issue with our usual staples—you know, in-depth "Thrash Tests," comprehensive "How To" articles, cool new products and tons of other useful stuff. Enjoy!

Peter Vieira

Peter Vieira, Editor
peterv@airage.com

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A Future In Trucking

Hey there, *Car Action!* I like your mag! I have been looking at several gas trucks and do not know which one to purchase. I can't decide what to get: the Traxxas Nitro Stampede, Nitro Rustler, or the Kyosho Baja Beetle. The area around my house is very rough in some areas and level in others. Is it possible for you to tell me which is the right truck for me?

Landon Mills
via email

Landon, the three trucks you have named each have their own "specialties." The Traxxas Nitro Stampede is considered an all-terrain monster truck and is extremely durable for use under rough conditions. The Nitro Rustler is more of a stadium truck, a class of vehicle better suited to a prepared surface or level ground and smooth jumps. Although plenty durable, it won't be as adept at handling the really rough terrain that the Stampede, with its massive tires and mondo ground clearance, can tackle. The Kyosho Baja Beetle is a unique machine that falls into a class of its own due to its reversing transmission. The Baja Beetle will handle bumpy ground but performs its reverse-to-forward "wheelie" tricks better on less challenging terrain.

Ultimately, Landon, any of these machines will be plenty of fun for you. One might be more "right" for your brand of R/C action, but none will be the "wrong" choice. —George

INTERNET ADDRESSES:

Chris Chianelli: chrisc@airage.com.
George Gonzalez: georgeg@airage.com
Peter Vieira: peterpv@airage.com
Greg Vogel: greg@airage.com

On or Off Dilemma

I have a dilemma! I want to get a nitro-powered vehicle, the only problem is I do not know whether to buy an on- or off-road car. I have an area by my house where I can run an on-road car, but it's kind of small. My other option for play space is my driveway, which consists of dirt and small pebbles. What can I do to enjoy both types of surfaces? Also, I have two Traxxas vehicles both with Qualifier radio systems. Will I be able to use these radio systems in a nitro car?

Nick Veit
Sioux, MI

Nick, there is a quick and easy solution to your problem, and it can be summed up in one word: rally. Rally cars are quickly maneuvering their way into the R/C car world. These sedan-style vehicles are designed to rip it up on all types of surfaces by virtue of their raised suspensions and block-tread tires. Fast on asphalt and a blast on dirt, rally cars could be the wave of the future. Tamiya offers a few electric versions, and Kyosho has both nitro and electric flavors. If you want to go big, check out Kyosho's new Inferno-based, 1/8-scale, nitro-powered rally machines.

As far as your radios are concerned, they will work in whatever car you choose, although you may need to get some additional servos unless you want to be swapping out radio gear every time you run!

—Greg

Motor Maker Mayhem

I have recently purchased a Reedy Fire Hawk motor for my truck. After talking with a few people, I found out that less turns in a motor can make it faster. I decided to perform a little surgery and take out a few of the winds in the motor and solder the loose ends. So far, I have not tried the

motor, but I was just wondering if you think it will still work and possibly run faster.

Derek Shipman
via email

That's an (ahem) interesting performance tip you've come up with there, Derek. Unfortunately, you've probably cooked your motor! Even if the armature still spins in the can, I can guarantee that the arm is wildly out of balance, and that will quickly wear out the can's bushings as well as slow the motor. You'll probably also "throw a wind," which means the copper wire will come off the armature as the motor runs, stopping the car dead in its tracks, shorting the motor and possibly wasting your ESC in the process. I suggest you get a nice, machine-wound modified motor and have fun with that for a while. Feel free to take it apart for cleaning, but leave the armature alone!

—Pete

Tight Touring

I own a Tamiya TA03F Pro touring car chassis that I race on a tight track. I have recently converted the chassis to the mid-motor configuration as explained in the fall edition of *Radio Control Touring Car*. When I was finished with the conversion, I measured the wheelbase and noticed that it was longer in comparison to the original wheelbase. I thought that with a longer wheelbase, less steering would be available. Is it true, or did I build the car incorrectly?

Eric Broo
Commerce, MI.

Eric, you are correct in assuming that a car with a longer wheelbase will tend to have a little less steering. For instance, if you cut your favorite car in half, added an inch to the length of the chassis, then screwed it back together, the car would not be as

nimble as it was before. However, you have done more to your TA03 than slightly lengthen the wheelbase; you've moved the motor from the front of the car to the rear! This changes the dynamics of the car's handling more dramatically than the slight wheelbase increase. You should find that your converted TA03 is more sensitive to steering input and requires a steadier hand to drive, although it should net you faster lap times once you master it. Here are a few driving tips to help you handle your car: when entering a turn, you will notice some steering loss, so either slow down for the turn sooner than you normally would, or stand on the brakes to help initiate the turn. As you exit the turn, you will be able to get on the power faster thanks to more rearward weight bias, and this is where your conversion will give you an advantage. —Greg

Making a 4x4 Turn

I am in the process of building a 4WD monster truck. I am not sure if I should stick with a standard servo for the steering. Should I spend a bundle and purchase a Futaba S9304 or equivalent servo?

Bobby Roberts
Kent City, MI

Kent, a standard servo will steer a 4x4 monster truck, but not with any authority; it's going to have a large turning radius and feel generally unresponsive. This is where those expensive servos come in. The pricier servos deliver higher transit speeds for faster response and greater torque to muscle those big monster treads around. If tight, nimble turning is what you need, save up your spare change and buy a servo with some brawn. —Greg

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," *Air Age Inc.*, Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

In search of fun
and glory, 'cause
life's too short
to be a sheep • by Chris Chianelli and Peter Vieira

INSIDE SCOOP



Kyosho **The company that never sleeps**

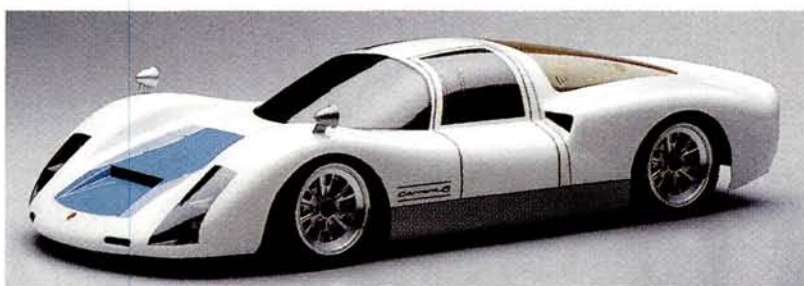
I have trouble keeping up with all the cool new stuff coming from Kyosho. Here are two—totally awesome, in my opinion—additions to their nitro line. The new 4WD F-Ten Formula 1 car has a new chassis—dubbed the GP Formula Type-3—and establishes a new category. The chassis features belt-driven, 4W independent suspension and oil-filled coil-over shocks. I know what some of you are thinking: “A 4WD F1 car?” Trust me, this is a good way to go if the parking lot you race on is less than perfect and has all the usual dirt and dust.

With the inherent stability of 4WD, think of all the high-speed parking-lot oval races you can have. Now, to add that scale excitement to these fun oval events, let's hope the body makers will offer some Indy-style bodies to fit the F-Ten. Though this is a new car, it appears to have some of the same mechanics as the proven Pure Ten GP Spider, so we can take advantage of such options as the 2-speed tranny.

While on the subject of the Pure Ten, check out this new addition to Kyosho's Nostalgia Series: the super-sleek Porsche 906 Carrera—definitely one of my all-time favorites. How would you like to drive to work in this outrageous road rocket? I think I'll talk to the boss and make some demands here!

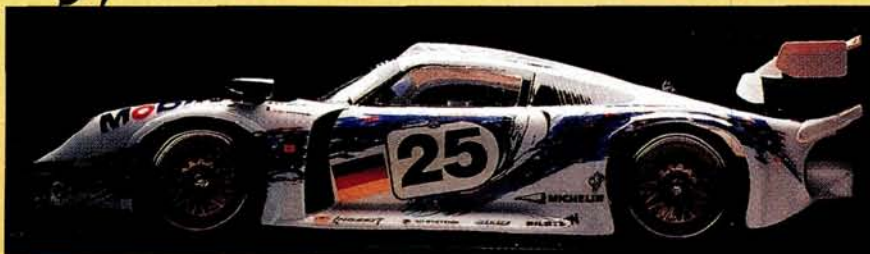


Anyway, in the mid- to late '60s, this car did battle at races such as Le Mans and Daytona with other legendary supercars such as the Ferrari 330 P4 and Ford GT 40, which, by the way, also happen to be in Kyosho's Nostalgic Series. For more information, contact Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300.



LATE-BREAKING NEWS FLASH!!

Tamiya's short wheelbase, mid-motor TA03RS took first class in the GT1 (unlimited) class at the Tamiya World Championships in Kange-gawa, Japan. Robert Itoh handled the driving, and initially showed up to race with a front-motor TA03. However, Robert found that this was not ideal for the



Kange-gawa track. He went out and bought a mid-motor TA03RS, stayed up all night building it, threw it on the track and won! Other American finishers included Joe Hoda who took home sixth place in N1 (a front-drive “spec” class), Roy Allan who placed 11th in M-chassis, and Mark Rebeck who finished 17th in the F1 class.

TRC tire shortage is over!

At 1:51 p.m. on November 10, '97, Trinity president Ernest Provetti officially announced Trinity's purchase of TRC. TRC produces on-road tires that are highly favored by many top competitors, yet lately, TRC equipment has been extremely scarce. On-road enthusiasts will be happy to know I've been told that Trinity is committed to full production of the TRC tire line to meet demand. Moreover, R&D resources will push the technology of the TRC tire line like never before. A complete product revamping is reportedly already under way and will include new tooling for racing wheels and cap tires. Also included in the new line is the TRC Disrupter on-road oval car. TRC will be set up as a separate entity with its own identity, management and all-new oval race team.

TRC



Bolink '98 Taurus Body

Bolink has released the first 4-door body for stock-car racing. Ford announced that it will replace the Thunderbird with the Taurus in the 1998 Winston Cup Series, and it was recently debuted at the Brickyard 400. With Ford's cooperation, Bolink has the body available now. It features a molded-in spoiler and detail decals, and it comes in standard and "pro-lite" versions. For more information, contact Bolink, 420 Hosea Rd., Lawrenceville, GA 30245; (770) 963-0262; fax (770) 963-7334.

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Gentlemen ... start your engines

The Traxxas EZ-Start electric starter will soon be available as an accessory for Traxxas Nitro Rustlers and Nitro Stampedes. It can be bolted in to replace the original recoil starter, and it provides the convenience of instant, one-button starting. It even lights your glow plug, so there's no need for a separate glow-plug igniter. Its extra heavy-duty internal mechanism was designed to survive the rigors of real-world use! Kit includes the starter control box, wiring harness and starter drive. It requires a 7.2V (6-cell) rechargeable Ni-Cd battery pack (not included). For more info, contact Traxxas Corp., 12150 Shiloh Rd., Dallas, TX 75228; (972) 613-3300; fax (972) 613-3599.



High-performance racing fuel

Top Fuel was specially formulated for use in Traxxas R/C model cars and trucks. Traxxas also claims Top Fuel will meet some other manufacturers' warranty specifications. The folks at Traxxas developed Top Fuel because they want to be sure that their customers get optimum power and engine life. To make an engine perform properly, having good fuel with high-quality ingredients is very critical.

Traxxas tells me they have spent hours and hours on track-testing this fuel. I've come to know the people at Traxxas, and I believe they have done just that before releasing Top Fuel to you. It's available in quarts and gallons, in both 10- and 20-percent nitro.

I don't know the percentage of lubricant in this fuel, so I can't tell you which manufacturers' specifications it will meet, but I can tell you the lubrication is a combination of synthetic and castor oils—the best of both worlds, in my opinion. Note: because of its different loading characteristics, Traxxas does not recommend Top Fuel for the Nitro Vee engine. For more info, contact Traxxas Corp., 12150 Shiloh Rd., Dallas, TX 75228; (972) 613-3300; fax (972) 613-3599.



Here's a first look at the Traxxas TEC-4 and its Calibra body. We'll be testing the TEC-4 soon!



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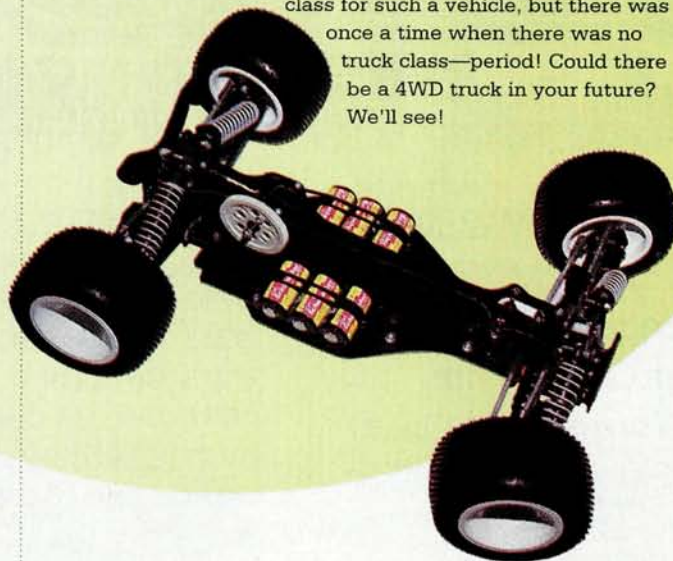
Nitro Z10

O FNA's new 1/10-scale sedan nitro machine has hit the pavement winning. A pre-production version of the Nitro Z10 took first and TQ'ed its first two races—the Paris Invitational in Vegas and the 25th Annual McCoy Championship. Totally new to the nitro version are the aluminum upper plate and lower chassis plate with countersunk screw holes to ensure a clean smooth bottom surface. Like the electric Z10, however, the new nitro version features: a full set of ball bearings; front and rear ball differentials with 1/8-inch diff balls; a no-flex chassis design; large-volume aluminum racing shocks; a no-"E"-clip hinge-pin design; competition-proven, 90-degree drive train; and fiberglass shock towers. For more information, contact OFNA Racing, 22600 Lambert St., Ste. D-1009, Lake Forest, CA 92630; (714) 586-2910.

Schumacher TRUCKS



W hat's this? Looks like a pair of new trucks from Schumacher (kinda rhymes with "Chewbacca," if you're wondering). The 2WD truck is based on the Fireblade and represents a paradigm shift in truck-think. Slightly narrower and certainly lower in profile than the typical racetruck, the unnamed vehicle was designed to combine the agility of a buggy with the bump-eating prowess of a truck. The category-defying 4WD machine is based on the successful CAT 2000. With big truck treads at all corners and all-wheel drive, this machine must stick like glue. There's no racing class for such a vehicle, but there was once a time when there was no truck class—period! Could there be a 4WD truck in your future? We'll see!



1/4-Scale Dune Digger

According to New Era Models, their Dune Digger "looks, acts and handles like the real thing." They further contend that the front suspension, which has 3 inches of travel, demonstrates no bump-steer at all. The car features: heli-arc-welded, 4130 tubular-steel frame (powder coated); 23cc gas/ignition engine; 16-ounce quick-fill tank for 45-minute run time;



independent rear suspension; modified truck trailing arms; quick-change gears; super-duty New Era shocks; 3.5-inch ground clearance; inflatable tires; dual-disk ventilated brake; double sealed ball bearings throughout; all-metal tie-rod ends; dual-servo steering system; and Kydex front bumper. All parts are machined of the highest-quality materials. Fully assembled, it costs \$995. For more information and available options, contact New Era Models, P.O. Box 7378, Nashua, NH 03060; (603) 888-4453.

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1998. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

F1 Fever

Ronn Sutton of Honolulu, HI, sent us this photo of his Kyosho 1/8-scale F1 car, which he purchased when he was stationed in Guam. For maximum speed and lane-swapping, Ronn runs it with two 13-turn triple Reedy Modified motors. He added a Tekin TSC 420-G2 speed control with Novak Polaris receiver, along with a 7-cell Sanyo 1700mAh battery pack, and he controls all this power with a Tekin FP-T2PBKA radio and Futaba S9304 BB servo.



Can't Drive 55

From British Columbia, Canada, Guido Medeiros and Kurt Koenig sent in a photo of their latest "mad" projects. Guido's Nitro RS4 Diablo sports a Nitro Star 15SS engine, 2-speed tranny, bearings and an Associated tuned pipe. Kurt's RS4 in Porsche trim runs with bearings, a Nitro Star 15SS engine, 2-speed tranny and Nova Rossi pipe. Keep 'em coming, guys ... they look great!

Benchmark Truck

Talk about meeting a car's hop-up potential! Zach Thomes of Missoula, MT, sent us a picture of his Team Losi Double-XR 'CR,' which he has equipped with a Novak Tempest Pro speed control, Airtronics radio system, Trinity D2 11-turn triple motor, Sanyo 2000 Ex-Tech cells and loads of hop-ups. These include: Trinity blue front brace, blue transmission brace and blue screw kit; Lunsford titanium turnbuckles; a Robinson Racing spur gear; Deans Ultra Wire and plugs; and a Losi anodized motor plate.

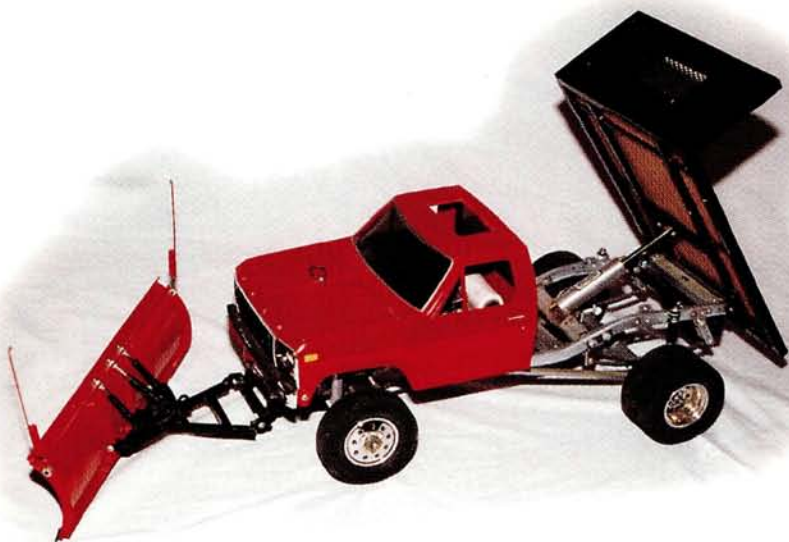


Road Rocket

Steve Iorio of Kenosha, WI, sent in this picture of his 1/5-scale Royal R/C motorcycle. With a Trinity 14-turn triple motor, Mtroniks Monster FET ESC and a 1700 SCR battery pack mounted on the bottom portion of the fairing, this motorbike is quick. Steve custom-painted the bike as a replica of Kenny Roberts's YZR500 racebike.

Unusual Utility

To keep busy during snowy Wisconsin winters, landscaper Greg Mutz designed, built and detailed this Tamiya Mountaineer to be a fully operational utility truck. After heavily modifying the electronic gear to squeeze it into the cab of the truck, Greg altered the axles and drive shafts to accept tires and wheels from a Tamiya King Hauler. He added a Tamiya Blackfoot body and then scratch-built the dump bed, snowplow, trailer and hitch from metal that he welded together. Other features include: a truck bed, which (obviously) tilts and has a Hobart air cylinder for raising the bed; a snowplow that is removable by pulling two pins and which trips forward and springs back again if it should hit a solid object; and a utility trailer with a working tailgate, ball-and-socket-type hitch, leaf springs and oak flooring. This winter, Greg plans to add a municipal-style salt-and-sand spreader for the dump bed.



Smoke Out

Marcus Falconieri of Las Vegas, NV, tells us that he "smokes" buggy and truck competition on smooth tracks with this Thunder Tiger Challenger Pro buggy, which he has modified with Losi oil and springs and Pro-Line Pro-83 tires. In addition, he has topped the buggy off with the Cat XLS body by Parma and uses the kit's stock Thunder Tiger .12 engine and Airtronics CX2P radio gear.



Body Beautiful

Ray Chu of Brooklyn, NY, tells us that he spent more time detailing the almost 2-foot body to this MRC World Scale Thunder King truck than he did building it. For power he uses dual 540 motors and a 9.6V 2000mAh 8-cell battery pack, and for control he uses two Futaba servos and a Magnum Jr. system with an MC210CB ESC. With this size and strength, this truck is able to conquer anything that gets in its path.



Modified Racing Monster

Ado Wessels of Conway Springs, KS, sent us this picture of his old Traxxas Sledgehammer, which he continues to modify for his daughter to race. From its original stock form, Ado has replaced the quad shocks with two Associated shocks; added HPI rims and Stampede tires for indoor racing; installed transmission and wheel bearings; placed the ESC in a laydown position so that lower body mounts can be used; and added Stampede front and back arms and drive links. In addition to all these great mods, he has equipped the truck with a Magnetic Mayhem Mad Science motor, Litespeed battery connectors and a Deans connector between the motor and ESC.

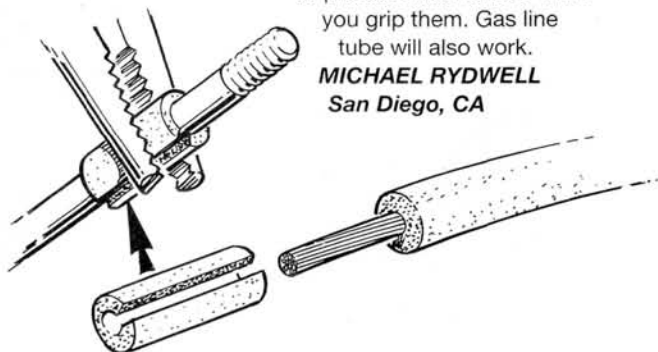
NOVAK
ELECTRONICS, INC. RACING TEAM



Get a Grip

Strip a piece of insulation off heavy-duty electrical wire, split it, and use it to protect shock shafts while you grip them. Gas line tube will also work.

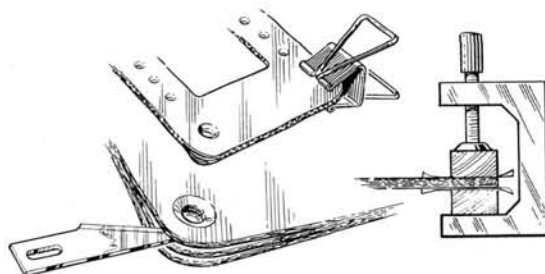
MICHAEL RYDWELL
San Diego, CA



Stuck-up Chassis

If your chassis suffers delamination around the bumper screws, smear slow-setting epoxy between the layers with an old knife blade and use a binder clip to clamp them together. If the damage is widespread, cover the epoxied area with plastic—top and bottom—then tightly clamp blocks of wood to each side to spread the pressure.

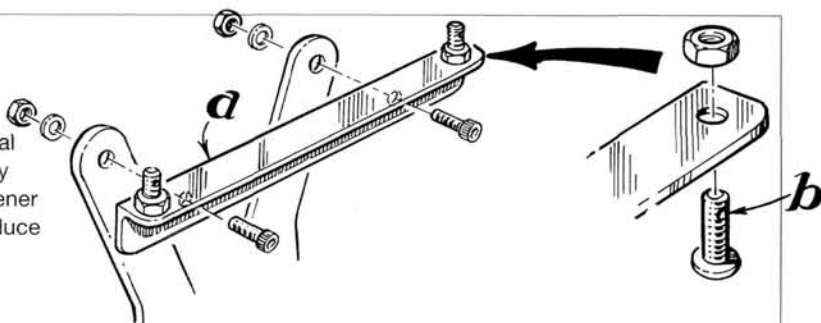
BRIAN SOULE
Tucson, AZ



Got an Angle

Replace broken body mounts with a piece of hardware store aluminum angle (a) attached as shown. The vertical screws (b) are drilled to accept the body clips or you can use Velcro®-brand fastener as described in "Pit Tips," July '97. Reduce the width of the angle to save weight.

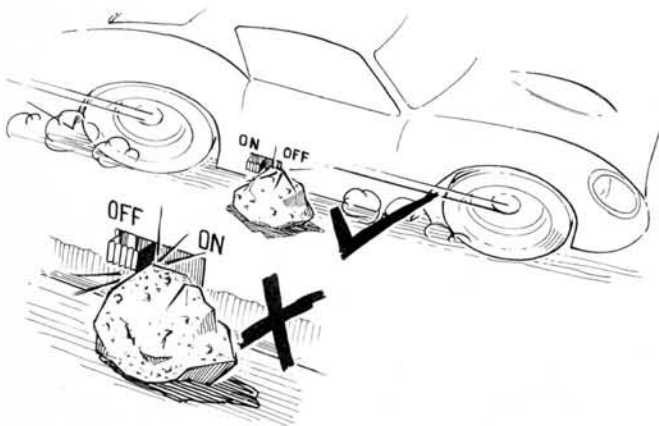
MIKE DEL MEDICO
Saugus, NY



(Don't) Knock it Off!

If you have an externally mounted switch, make sure it cannot be knocked into the "off" position by a rock or a stump. Turn the switch around so that the "on" position is to the rear (as shown). Now it can only be knocked "on."

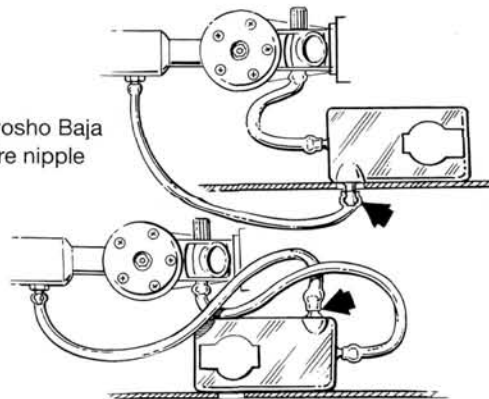
BLAKE BONKOFKY
Louisville, KY



Tank Talk

Reverse the tank on your Kyosho Baja Beetle to protect the pressure nipple from hard knocks.

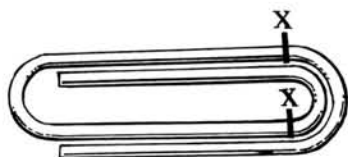
CHRIS BEESON
Santa Cruz, CA



Magic Pull-Tab

If you lose the radio-crystal pull-tab, you can make an effective replacement by wrapping Scotch Magic Mending Tape around the crystal and squeezing together the upper parts.

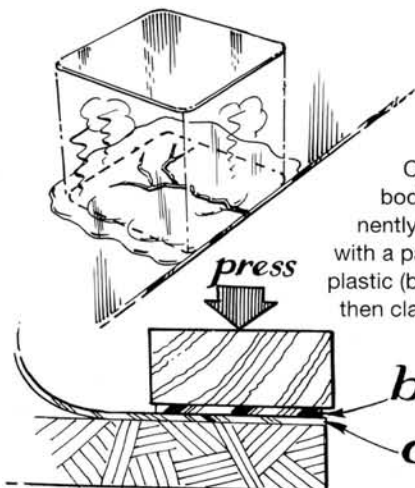
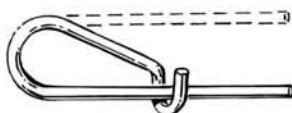
STEPHEN M. HILL
Joplin, MO



Body Clips Again

Keep a few jumbo-size paper clips in your tool kit. Lost body clips can be made quickly by cutting at the "x" and then bending the paper clip as shown.

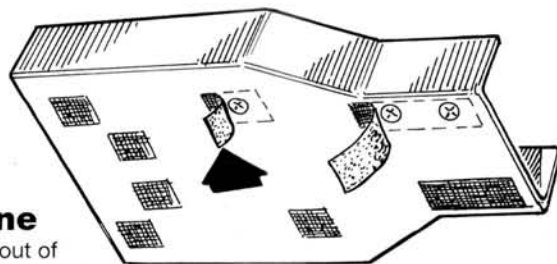
J.R. COZBY
Carrollton, TX



Hot-Glue Sandwich

Cracks in polycarbonate bodies (a) can be permanently and securely repaired with a patch of polycarbonate plastic (b) applied with hot glue, then clamped firmly under a wood block. Work fast because the glue cools rapidly.

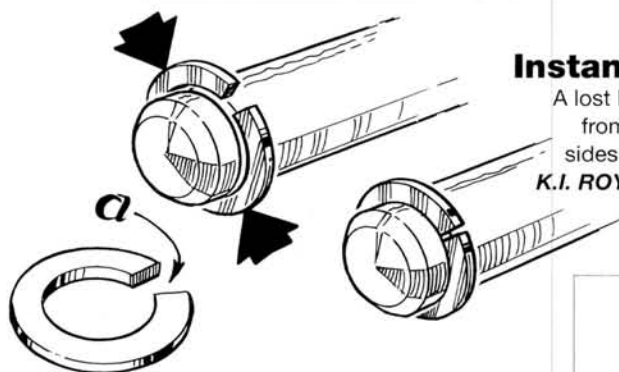
MELVIN FUNG
Selangor,
Malaysia



Slot Machine

Keep mud out of the screw slots and make teardown easier and faster. Cover the screw heads with patches of high-quality duct tape, which peels off cleanly.

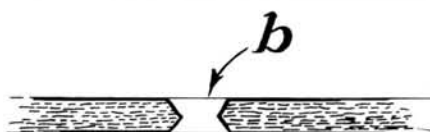
LEE PREWETT
Bakersfield, CA



Instant E-Clip

A lost E-clip can be replaced with a modified washer. Snip a piece from a plain washer (a) and use pliers to gently squeeze both sides (as shown by the arrows) to keep it in the groove.

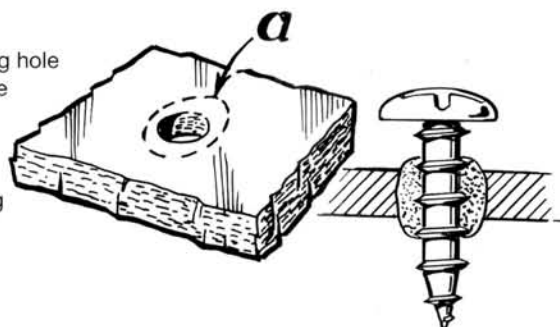
K.I. ROYCE
Boise, ID



New Threads for Old

Epoxy can replace stripped-out threads in plastic. File an oblong hole (a) to prevent the epoxy blob from spinning while you tighten the screw. Coat the screw with oil, put epoxy in the hole and push in the screw. When the epoxy has cured, remove the screw and file the epoxy flush. In thin material, drill from both sides (b) to make an hourglass shape to prevent the epoxy from being pulled out while you tighten the screw.

MATTHEW MOORE
Winston-Salem, NC



Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



How fast guys go fast

HAVE YOU EVER wondered how some racers always go faster than others? Even with virtually identical equipment, one driver will wind up with lap times that are a second or two shorter than those of others with comparable

little things work in his favor.

This month, I cover five "little things" that, when used together, can result in truly dramatic performance enhancement.

AXLE BEARING MAINTENANCE

So you've spent big bucks and equipped your car or truck with a complete set of sealed ball bearings. That's great, because



bearings maximize the flow of horsepower through the entire drive train; neglected ball bearings, however, can soon lose their performance edge. Bearings sitting inside the transmission are pretty well-protected, but those on the axles have a much harder life. With exposure to the elements, those bearings will slow down a little at a time until they reduce the performance potential of your sophisticated racing machine.

By regularly paying attention to basic maintenance procedures, you should be able to make those rollers last through several seasons. Between heats, use a soft, clean paintbrush to remove any dirt, grime or dust

driving skills. Give that guy five minutes, and he'll put a lap on the field!

Performance like that makes people scratch their heads and wonder what kind of black magic or super-secret technology is being used. More often than not, the answer is very simple: the guy isn't cheating and he probably isn't buying his way into the winners' circle, either. Instead, he has discovered that speed and consistency come from paying attention to the details, and he's willing to invest the time to make sure that all of the

Bearings maximize the flow of horsepower through the entire drive train; neglected ball bearings, however, can soon lose their performance edge. Proper maintenance will extend service life and make your car more efficient.



Take the time to experiment with shock fluids, spring rates, shock-spring preload and weight distribution until you know how to make your chassis react to any kind of surface.

that covers the bearing seals. The really fine stuff is your enemy. If given a chance to work its way inside the bearing assembly, it will turn that lovely, smooth action into a gritty, notchy feel because the fine grit acts like sandpaper on the bearing races and balls.

Carpet guys must also pay attention because fine carpet fibers wind around the bearing race and lock up the wheel. Remember to pull the wheels off the axles after each race and clean everything before the next heat. Once a month, pull all the bearings out of their sockets and soak them overnight in Boca's* bearing cleaner, or spray them off with motor spray followed by a drop or two of a very thin oil. If you aren't sure whether you have a problem with your bearings, take the pinion gear off and push the car across a hard, flat surface such as the kitchen floor. If it coasts nicely and glides to a stop, you're OK; but if it slows down and stops abruptly, it's probably time to check out the bearings.

SUSPENSION SETUP

Really fast guys have cars that don't bottom out, bounce off the jumps, lean over at outrageous angles in turns or appear out of control. In fact, these drivers don't look

fast at all because their cars and trucks are so well set up that they get around very quietly. Take the time to experiment with shock fluids, spring rates, shock-spring preload and weight distribution until you know how to make your chassis react to any kind of surface.

This isn't something you learn from a book—unless it's a book you write yourself. Buy a spiral-bound notebook and keep it in your pit box; every time you make a suspension change, note it (along with the results) in the book. After a year or so, you'll be able to refer to your notebook instead of blindly changing shock oil or guessing which spring to use. Sure, you can talk to other tuners at the track and see whether their setup might work for you, but since individual driving styles differ, in the long run you're probably better off discovering your own ideal setup.

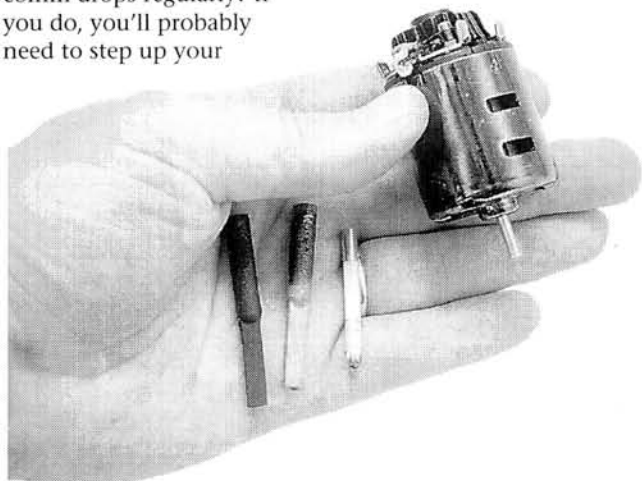
MOTOR MAINTENANCE

I've written many articles about how to care for your stock or modified motor, but the best advice I can give is to be consistent. Regular motor maintenance is the key to racing successfully in any class. I don't remove and clean my motor after every heat, but I do pull

it out, clean the comm, remove brush glaze and re-oil the bushings every three or four times I run my car.

Oval guys and off-roaders who run under particularly onerous conditions should do this more often, but the rest of us can get by with a weekly cleaning. If you go through a lot of brushes, however, this would indicate that your motor is running very hot or that the surfaces you run on are dusty and gritty. Does your motor's commutator look dark or smeary? Do you use comm drops regularly? If you do, you'll probably need to step up your

surface and slow the car down on the straights and might make it spin out in the turns. I've even seen situations where motor wraps that are too old and saggy to fit tightly on the motor can will droop on the carpet between the motor and the track. The ideal setup is for your car or truck to be just high enough to clear the track when the suspension is compressed while turning, absorbing bumps, or jumping. That's the fastest—and most consistent—way to get around the track.



Regular motor maintenance is the key to racing successfully in any class. Set a schedule for cleaning and inspection, and stick to it!

cleaning program. It takes just a few minutes to make your motor nice and clean, but the extra effort will ensure lap-time consistency.

GROUND CLEARANCE

How much space is there between the bottom of your chassis and the racing surface? Really fast racers check this before every heat, especially if they run on a bumpy track with lots of jumps (you'll find dirt on the rear of protruding screw heads) or indoors on carpet. Even slightly exposed screw heads can catch on carpet fibers, which will drag on the

frequently beat less skilled drivers using high-zoot stuff. Even among good drivers, however, there are those who manage to get to the front because of their efficient driving style.

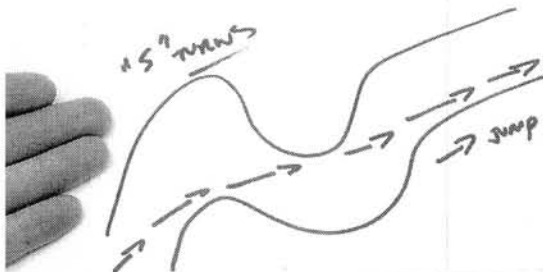
It takes more than aggression, good eyesight and the reactions of a cat to make the A-Main at a big regional, national or international event. You need to see the track as a series of turns (not just one corner after another) and to use the exit line from the previous apex to maintain maximum momentum into the next section.

Draw a diagram of the track layout, and study it to find the shortest and most efficient line through the corners. The impulsive driver tries to slam his car around the track and bully his way through traffic, but the fast guys just hustle efficiently through the corners, whispering by when the driver in front makes a mistake or misses an apex. You may not notice the really fast racers, but you'll be sure to spot them in the winners' circle!

**Addresses are listed alphabetically in the Index of Manufacturers on page 193. ■*

DRIVING TECHNIQUES

You already know that good drivers using mediocre equipment



Diagramming the trickier portions of the track can help you visualize the fastest lines for a quick trip to the winners' circle.



Tech Tips on Cyclone Customizing

So you've got the setup — you have the **Cyclone** and either the **Pit Wizard** or the **ESC Profile Software**. You know you are able to fully customize the Cyclone to your liking, but where do you begin?

Well, one overlooked and obvious starting point is the instruction manual. It has step-by-step programming instructions for the Pit Wizard or ESC Profile Software. It also has definitions of important terms you should understand such as **Drive PWM Frequency**, **Minimum Drive** and **Deadband** just to name a few. It is also filled with helpful graphics to illustrate the points being made.

Straight from the Tech

The following are a few basic tips from the Novak race team.

Whether you're racing stock or modified motors, most drivers will want to decrease the Deadband percentage to 3% or 4% since the Cyclone's Deadband is initially set fairly wide. Remember, Deadband is the space between Minimum Brake and Minimum Drive, with Neutral located at the center of this space.

Drive Frequency

Keep in mind that by changing the value of the Drive Frequency, you change the manner in which the vehicle responds to transmitter trigger input.

Let's assume the track condition has medium to good traction. For stock motors, a good starting point to set the Drive Frequency is between 1.95-7.8KHz. For modified motors, a good starting point is between 11.7-23.4KHz. Remember, more traction requires lower frequencies; less traction requires higher frequencies.

Minimum Drive

With the same medium to good track conditions, a good starting point to set Minimum Drive for stock motors is between 4-8%. For modified motors, a good starting point is between 1-4%. If more initial throttle is desired, increase the percentage.

This should help you get started with creating your custom profile. For reference, see the instruction manual or visit our website: www.teamnovak.com.

NOVAK ELECTRONICS, INC.
18910 Teller Avenue, Irvine, CA 92612
• (714) 833-8873 •

Advertisement

TS# 48



TROUBLE SHOOTING

by Doug Mertes

We're Here to Help

I have a stack of your magazines to refer to. However, there are still a few problems my friends and I can't fix. After a year of use (and abuse!), the bolts on my Losi Double-XT are starting to strip the threads in the chassis. Is there a simple way to fix this? I've already tried Goop, and that didn't work. I also have a Clodbuster, and I'd like to buy Trinity Sapphire motors for it. Which one should I reverse the endbell on to get reverse rotation? Last, I have a 4-cell battery pack that fits in my Associated RC12L. If I charge it at any rate higher than 2 amps, the charger overheats. Unfortunately, at that rate, it takes an hour to charge the battery! Am I stuck with these problems, or is there a way to help me? Thanks, and keep up the good work.

JASON JENNINGS
Mentor, OH

Jason, we really appreciate your kind words. I have a library of back issues going back 10 years; they seem to come in awfully handy when I'm trying to identify the solution to a problem on the workbench late at night. Let's take your questions one at a time. Forget repairing the semi-stripped threads on

your Losi chassis. Those screws take a lot of stress and abuse from bumps and jumps, and there's nothing you can do to add strength to the remaining shallow grooves. Chassis are cheap, anyway, and you should really look at this as

an annual maintenance item. The Trinity Sapphire motors will work on your Clod, and you can pick them up at great prices now that Trinity has released their updated GT-1 series of mods. Reverse the endbell on the front motor but be certain not to change the timing. The timing mark on the endbell should be precisely 180 degrees from where it was when you bought it.

Unless you're dealing with a lot of steep hills, sand, or deep grass, the stock gearing should do just fine. Regarding the 4-cell battery pack for your 12L, check the directions that came with your charger or contact the manufacturer for guidelines. Many of today's less expensive chargers are designed to work only with 6-cell packs, and some, such as the older Tekin DC units, require that an additional resistor be placed in line to safely charge four cells. The fact that your charger becomes really hot during charging is a signal that something isn't right.



Touring Car Quick-Fix

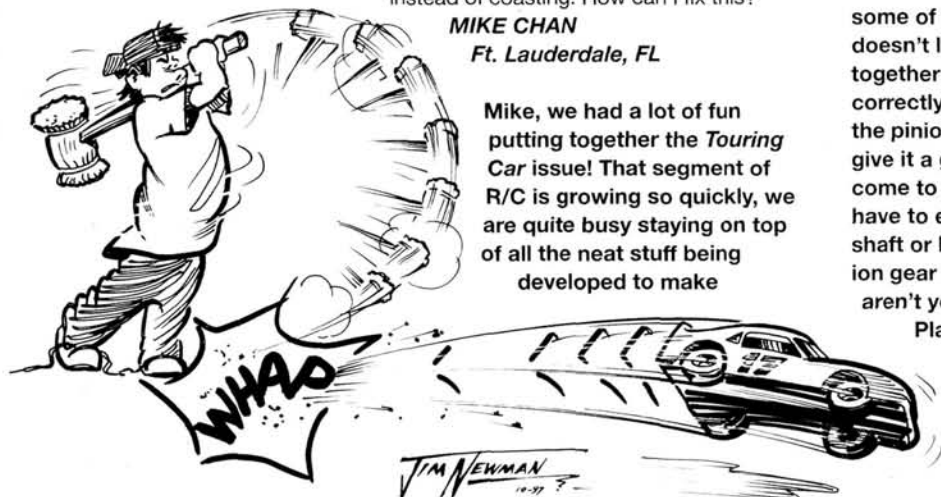
I own a Tamiya TA03 Kure Nismo. I read your *R/C Touring Car* issue and decided to hop up my car in a couple of ways. I installed Tamiya's low-friction shocks, and they worked perfectly, but when I tried to upgrade the motor, things went wrong. A friend of mine ordered a Kawada 13-turn modified motor for me from Japan, which I thought would make the car very fast. Instead, it makes a lot of noise and accelerates very slowly. When I let up on the throttle, it stops immediately instead of coasting. How can I fix this?

MIKE CHAN
Ft. Lauderdale, FL

Mike, we had a lot of fun putting together the *Touring Car* issue! That segment of R/C is growing so quickly, we are quite busy staying on top of all the neat stuff being developed to make

sedans go faster. The TA03 is an innovative design, and those new, low-friction shocks really seem to make it easier to fine-tune the suspension settings. A hot modified motor such as the Kawada 13-turn your friend bought for you should make that car sing down the straights! It sounds to me as if your problem is relatively simple. Start by pulling off the front gear-case cover and removing the motor screws. Now remove the molded spur gear (that's the one that mates with the pinion gear on the motor). Are the teeth straight and sharp, or have some of them been rounded off or bent? If the spur doesn't look perfect, replace it. Get everything back together (make sure that the spur gear's shaft is seated correctly in both the gearbox and the cover), but leave the pinion gear off the motor. Put the car on the floor and give it a good shove. Does it coast for a while, or does it come to an immediate halt? If it stops right away, you'll have to examine the entire drive train until you find the shaft or belt contact that's binding. Last, replace the pinion gear (you are using a metric-pitch Tamiya pinion, aren't you?) and carefully check the pinion/spur mesh.

Place a piece of paper between the pinion and spur and tighten the motor screws to set the correct mesh, if you're unsure. You should be ready to conquer the 'lot!



Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



52
RACETech Motor Timing Gauge



54
Robinson Racing Six Pack Starter Set



54
RPM Chrome Sedan Pipes



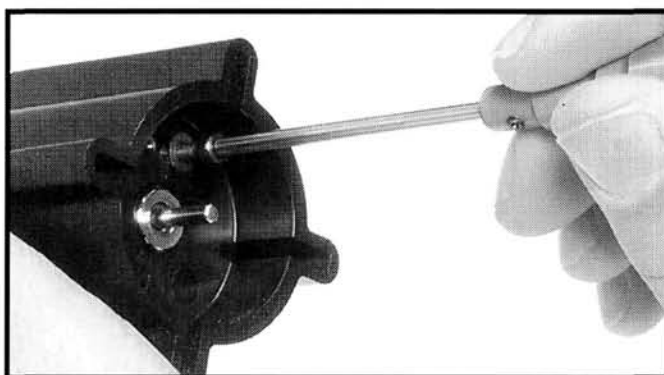
56
APEX Battery Charger and Discharger

RACETech Motor Timing Gauge

MEASURE YOUR TIMING WITH PRECISION

HAVE YOU EVER disassembled one of your modified motors only to lose track of its timing and find yourself wondering why it seemed to run better before you rebuilt it? Have you ever wondered how to accurately check the timing of your stock motors—or that guy's stocker that seemed suspiciously fast? RACETech* offers a new Motor Timing Gauge that quickly and easily allows you to check and adjust your motor's timing with precision and perform a few other jobs as well. Here's how:

The gauge is very simple to use. A sighting window in the bottom of the unit is used to accurately position the motor. When it's positioned properly,



It only takes a few twists of an Allen key to set up the gauge. A sighting window makes it easy to align the motor can for accurate readings.

the motor's own mounting holes secure it in the gauge. To check the motor's timing, just note the degree mark (there are 2½ degrees between the marks) that lines up with the timing mark on the motor's endbell. If you want to alter the timing, simply loosen the endbell, twist it over to the appropriate degree mark and retighten it.

To test the accuracy of the degree markings, I decided to test a ROAR stock motor that, like all ROAR stockers, has a fixed endbell with 24 degrees of timing. Sure enough, the gauge indicated 24 degrees, on the nose. By the end of the day, I had checked the timing for everyone at the

Just loosen the endbell and give it a twist to adjust timing. The can won't budge because it's mounted to the gauge.



It looks simple, and it is! The RACETech Motor Timing Gauge is a tool you'll reach for often.

track (well, all the electric guys, that is).

RACETech's gauge is so easy to use and understand that even beginners can time their motors without trouble. Not only did the RACETech gauge make it simple, but it also made it fun. Then again, when isn't working on R/C cars fun? [Editor's answer: 3 a.m. the night before a race].

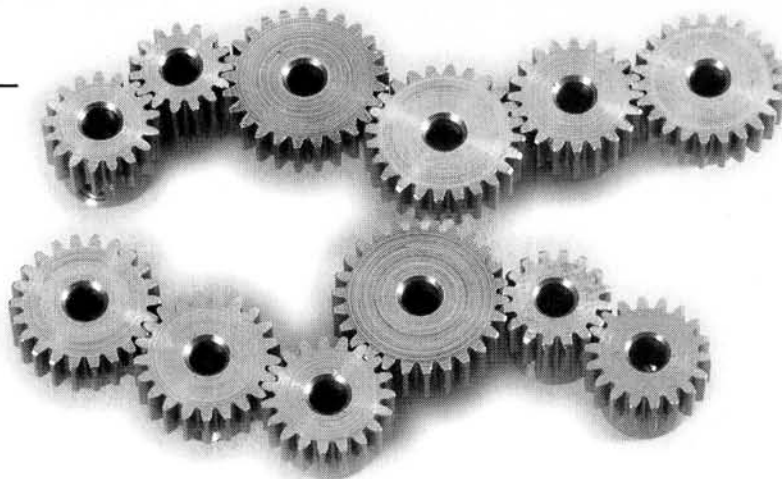
Adding to the value of the gauge is its effectiveness as a motor-maintenance stand. Its four molded "legs" allow it to stand upright on any surface—even on carpet, for those of you who use a carpet tile to pit on. The gauge holds any 05-type motor perfectly as you solder. Burnt fingers? No more! Since the motor shaft is held off the bench top, you can even break in motors while the gauge holds them.

There are a lot of tools on the R/C market. Some are extremely useful, while others are just neat to have. The RACETech timing gauge definitely falls under the "useful" heading. In addition to being an accurate timing device and an excellent stand, it is well-made and inexpensive. —Tim Knowlton



ROBINSON RACING Six Pack 48-Pitch Pinion Starter Kit

GEAR IT TO WIN



JUST GOT a new R/C racing vehicle, huh? Well, you'll need some pinion gears to get it geared just right for the track you plan to race on.

Then comes the most asked R/C question of all time: "Which pinion gear should I use?"

The answer? We don't know. Track type, battery capacity, driving style and other factors come into play, so there just isn't an easy answer. But we do know that if you want to race competitively, you'll need several pinion gears in your pit box.

Enter Robinson Racing Products* (RRP). RRP has made life a little easier by providing starter packs of 48-pitch pinion gears that include six gears in one handy package. The Six Pack Starter Set is an economical way to experiment with a variety of gear combinations before plopping down hard-earned cash on those lightweight, hardened, premium pinion

RRP's Six Pack 48-Pitch Pinion Starter Set is a great idea. The starter sets are available in odd and even sizes, and they provide racers with many gearing options.

gears. The set includes RRP's standard, precision-cut pinions, which provide a perfect mesh with all standard 48-pitch spur gears.

Two 48-pitch starter sets are available. Starter Set 1055 includes 15-, 17-, 19-, 21-, 23- and 25-tooth pinion gears, and Starter Set 1050 includes 16-, 18-, 20-, 22-, 24- and 26-tooth pinion gears. Odd or even, the choice is yours. You'll be able to gear your vehicle for stock or modified racing and set it up for most track conditions. So what are you waiting for? Pick up a six-pack and go racing (a six-pack of pinion gears, that is).

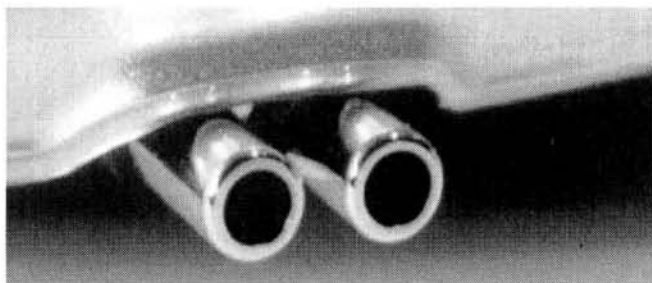
—George M. Gonzalez

RPM Chrome Sedan Pipes

CHROME TIPS FOR YOUR TAIL

IF YOU'RE LOOKING FOR the perfect accessory to get the concours judge's attention, it's here—chrome tailpipe tips from RPM*. Designed to bring home the concours cup, these chrome sedan pipes add that true-to-scale appearance your ride needs. They're offered in two popular styles: Slim Twinz (part no. 8122) are dual chrome exhaust tips that have a custom stock look; the Fatboys (part no. 8121) faithfully replicate the 4-inch-wide chrome pipes found on many customized sedans.

The new pipes from RPM install in minutes, and you won't



Slim Twinz are what you need for that extra touch of realism.



The Fatboys like to cruise, too. They're a perfect match for my Kawada Lexus LS 400.

need to use a cutting torch. In addition to the pipe tips, a self-tapping screw and an 1/8-inch-thick, black-plastic, mock muffler face are included. The tip is screwed onto the mock muffler, which can be attached to the inside of the rear bumper with a screw or servo tape. Note: as real as these pipes look, they're not functional (I could tell you gas guys were getting excited!).

Well, there you have it; now you can put the finishing touches on your touring car for that blue-ribbon win, or maybe you just want to outclass your buddies at the corner parking lot. They'll be asking for your tips—RPM chrome pipe tips, that is!

—Kevin Meyer

APEX

Battery Charger and Discharger

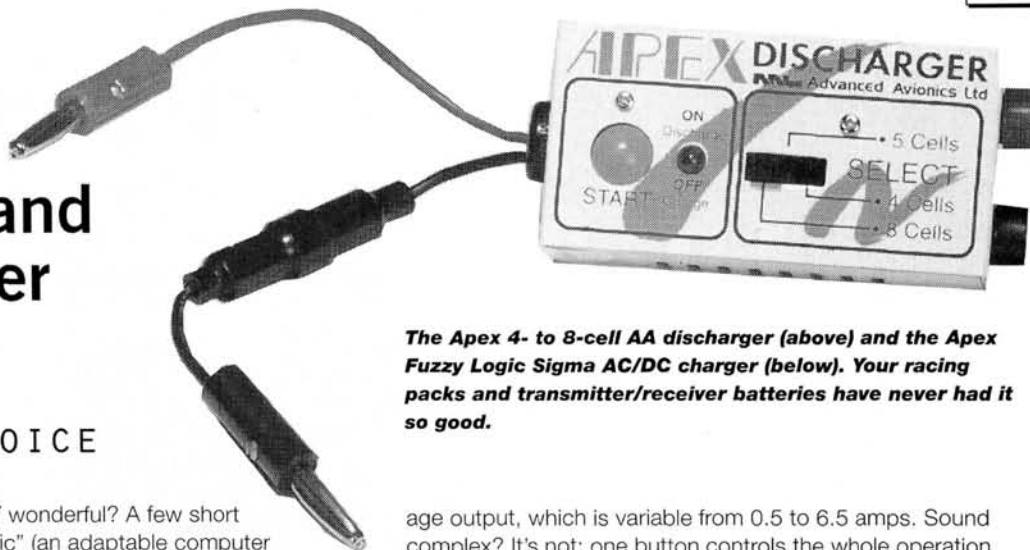
A FUZZY
(LOGICAL)
CHARGER CHOICE

ISN'T TECHNOLOGY wonderful? A few short years ago, "fuzzy logic" (an adaptable computer system) was pure science fiction—something you might catch a vague reference to on "Star Trek." But now you can experience the future of Ni-Cd battery charging today with the Apex* Fuzzy Logic Sigma AC/DC charger and discharger. The charger is high-tech-looking (heck, its retina-scorching, fluorescent-yellow color alone could charge batteries). It has blinking lights, it beeps, and it makes a really neat whirring sound. With it, you'll be the envy of everybody in the pits; here's why:

The Apex has an 8-bit 4MHz CPU with 8K ROM, 1K RAM current-control output; this is as much computing power as most PCs had not too long ago. Essentially, the electronic brain allows the charger to sense the number of cells that are in a pack and automatically adjust to the idiosyncrasies of that pack's charging requirements. The Apex can charge 4 to 9 cells on AC (house current), or 4 to 7 cells on DC (12V car battery). This system practically guarantees a fully peaked, 100-percent-race-ready battery pack.

Have you ever set a car down on the grid with a battery you *thought* was fully charged, only to find out differently four laps into the race? Not a problem anymore. After a pack is charged, the Apex digital display lets you

check the battery's voltage or its capacity in mAh. (That capacity thing could also come in handy for figuring out how much run time you have left after a qualifier, and that might help you figure out how to gear for the Main!) The digital display also tells you the charger's adjustable amper-



The Apex 4- to 8-cell AA discharger (above) and the Apex Fuzzy Logic Sigma AC/DC charger (below). Your racing packs and transmitter/receiver batteries have never had it so good.

age output, which is variable from 0.5 to 6.5 amps. Sound complex? It's not; one button controls the whole operation, and that can come in handy if one of your hands is super-glued to a tire ... as if that ever happens.

IN THE MODE

The Apex has three charge modes and one discharge mode. Push the button once; it beeps, and fast-charging begins. Hold the button until you hear two beeps, and you are in a 4A discharge mode. Push the button twice, listen for the three-beep confirmation and wait for the magic; the battery will discharge to about 1.5 volts per cell, then automatically fast-charge to peak. This is a one-cycle mode that helps to minimize the memory Ni-Cds can acquire if not fully discharged before recharging. Push the button twice and hold for 2 seconds; the Apex will beep four times and go into "recycle charge." This will continually charge and discharge a battery until you stop it by pushing the button once more. In some cases, this process can re-train a bad battery pack to function properly again.

Another feature is the Apex's compact size. It fits comfortably on the top of my toolbox (along with six batteries, two sets of sedan tires, a multi-piece screwdriver set, pliers, a bottle of superglue and a granola bar for my mid-race-day snack).

Apex also offers an equally small and versatile discharger for your delicate transmitter and receiver battery packs. This neat little unit is designed to be used with any charger. It discharges before it automatically trickle-charges an 8-cell Ni-Cd transmitter, or a 4- to 5-cell Ni-Cd receiver pack. Use this little gem to cycle your batteries the same way as you would your race packs to help eliminate the dreaded "memory effect"; it can also increase the capacity and usable life of your AA-size Ni-Cds. It would be a worthwhile investment for anyone who uses Ni-Cd transmitter/receiver batteries (especially you nitro freaks).

The Apex charger and discharger is a confidence-inspiring package. I don't know if it will help you become the next ROAR champion, but anything that helps make race preparations a little easier and less nerve-racking will be reflected in your composure on the drivers' stand.

—Louie Patterelli ■

* Addresses are listed alphabetically in the Index of Manufacturers on page 193.

thrash
TEST

1/10 scale electric



Long live the king!

TAMIYA King Blackfoot

by Doug Mertes

DO YOU REMEMBER the very first monster truck? It was called the Tamiya® Blackfoot, and although it was based on an older off-road buggy called the Frog, most of us old folks generally recognize it as the vehicle that started the entire truck-racing scene. Sure, it had some shortcomings: the stock hex-head dogbones would easily strip and become rounded; it had a trailing-arm rear suspension that produced some occasionally bizarre handling characteristics; and the hard plastic rear body mounts would break at the slightest provocation. Still, I remember when Tamiya's Blackfoot was the premier performer in that amazing, new, big-wheel class at the local track.

Over the past 10 years, Tamiya has sold an enormous number of those original Blackfoot kits. They've even put the model through an upgrade program; their Super Blackfoot of several years ago cured many of the rear-end blues and came with a revised gearbox that incorporated true metal dogbones and slotted stub axles. The twin-link front suspension continued to plague the steering geometry, however, and suffered from bump-steer every time the chassis encountered a good-size rock or a curb. With the introduction of many newer big-tire truck designs, some of us thought that the Blackfoot's days were numbered. We were wrong!

Tamiya still have a few tricks up their sleeves. They've discovered ways to improve the new model, made it possible to retrofit those improvements to older versions and retained the basic chassis so that replacement parts still fit all three versions. Let's take a look at this improved recreational backyard basher and see what it's made of: meet the King Blackfoot!

specifications

SCALE 1/10
LIST PRICE \$220

DIMENSIONS

Length (overall) 16.5 in.
Wheelbase 9.88 in.
Width (F/R) 11.75 in.

WEIGHT (gross, RTR) 5 lb., 2 oz.

CHASSIS

Type Space frame
Material Plastic resin

DRIVE TRAIN

Type Gear reduction
Primary Pinion/spur
Differential(s) Gear diff
Bearings/bushings Bushings

SUSPENSION

Type (F/R) H-arm w/fixed upper link
Damping Coil-over shock w/lubricated tube damping

WHEELS (F/R)

Type Molded plastic
Dimensions (DxW) 2.2 in.

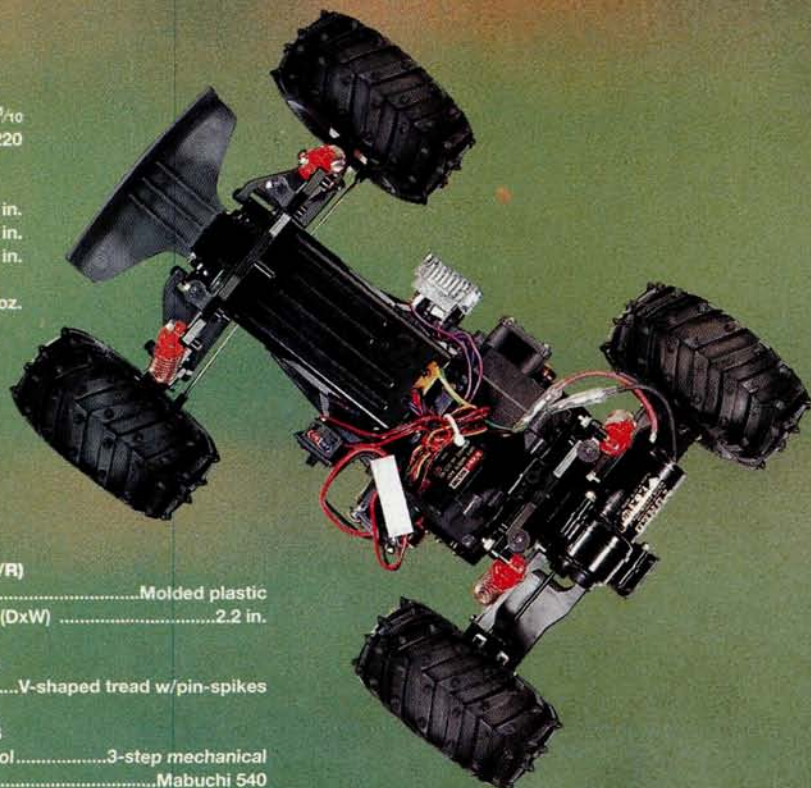
TIRES (F/R)

Type V-shaped tread w/pin-spikes

ELECTRICS

Speed control 3-step mechanical
Motor Mabuchi 540
Battery Not included

PHOTOS BY WALTER SIDAS

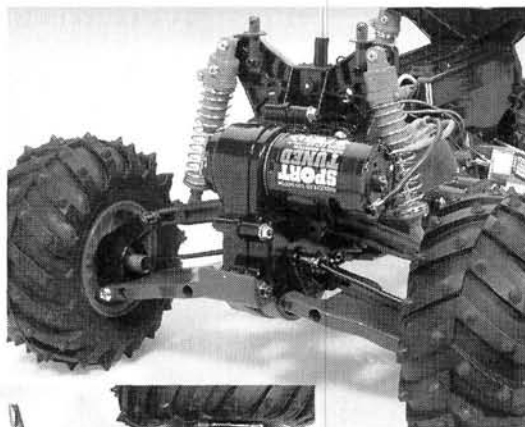
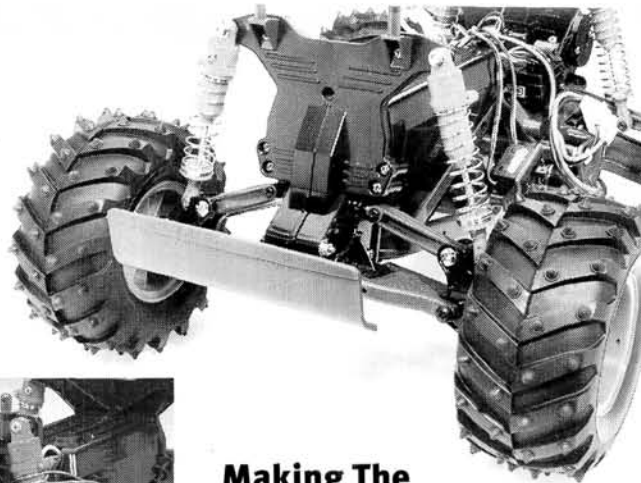


TAMIYA KING BLACKFOOT

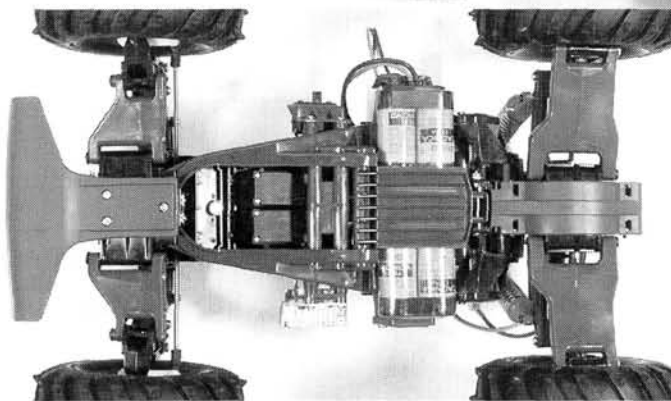
THE KIT

Construction begins with the assembly of the gear-type differential and gearbox. Stout and reliable, these parts should last through many seasons of off-road abuse before they require any maintenance. Unlike the older design's multiple side plates, chassis perimeter, threaded metal inserts and many clamping screws, this gearbox is very simple and can be put together in just a few minutes, even by a neophyte builder. It uses a modern case design that requires only four through-bolts to seal the internals against the sand and dirt encountered by off-road adventurers. You'll still need to use the special, long-shaft pinion gear that mates with the coarse-pitch spur, but the resulting reduction rate is suitable for anything from a 540 can motor (like the one that's included with the kit) to a hot stock or mild modified. The rear suspension now features a conventional H-arm and fixed-length upper link, and the

With an additional adapter, Tamiya's designers incorporate A-arm front suspension in the new King Blackfoot package.



Above: Note the H-arm suspension and steel dogbones. What an improvement over the original parts! Left: the plastic space frame-type chassis is both light and strong. The design dates back to the mid-'80s, but it still works well.



Making The King a Little More Royal

This King Blackfoot kit is complete and requires no additional parts in order to get it up and running. After some time with the finished product, however, I suggest a few additions:

- **Bearings.** You'll need a dozen 5x11mm bearings; it's hard to beat Tamiya's blue sealed units (part no. — 53008). Once they're installed, you can forget about 'em.
- **Shocks.** The kit's coil-over units are OK, but they don't really provide the damping action that a true rough-and-ready Blackfoot driver will appreciate. Tamiya's Hi Top metal-body oil-damped shocks (53037) are the ticket and they can be bolted right on.
- **Electronic speed control.** The kit's mechanical unit works well, but an ESC can handle a hot motor more easily and generally requires no maintenance once installed and set up. I installed Hitec's excellent SP520 unit with forward and reverse to match the Lynx AM radio. It fits easily on the chassis, the proper connectors are already attached, and it's super-reliable.

• **Motor.** The kit's 540 Mabuchi motor works well with the MSC and provides 12 to 14 minutes of run time with a decent battery pack, but it's a little, well, slow. I replaced it with one of Tamiya's Sport Tuned 540s (53068), which is actually a 23-turn modified armature in a 15-degree can. It provides about the same horsepower as a ROAR 91 open-endbell motor, and it really made the King scoot!

• **Lights.** Readers who have seen some of my previous articles on sport vehicles know that I like lots of lights and the brighter, the better. Tamiya includes a set of their headlight bulbs and wiring (50320) with each of the King Blackfoot kits sold during the introduction run, and they work well. I'm still searching for a way to illuminate the units on the roll bar, however.



Building & Setup Tips

This is an easy kit to put together. Tamiya learned a long time ago that high-quality molds and good parts organization combined with a killer assembly manual make for a satisfied customer. Even so, allow me to offer a few tips that even experienced builders should take to heart:

- **Read the manual.** Take the time to thoroughly read and understand the assembly manual before you start putting anything together. Make notes in the margin about steps you don't understand or additional parts or tools you may need to purchase.
- **Get organized.** Use several small plastic butter tubs, zip-close sandwich bags or clear plastic cups to keep everything organized while you search for all those little screws and nuts. This is especially useful for those of us who set up on the kitchen table and then put everything away at the end of the evening.
- **Prepare the parts.** Most of the parts in this kit come on a parts "tree." Carefully clip the parts off as you need them with a side cutter or nail clipper. Use a hobby knife or sanding stick to remove any remaining nubs.
- **Measure carefully.** Things like steering links and the tubing inside the shocks need to be the proper length in order to function properly.
- **Make sure you pay close attention when**

THINGS YOU'LL NEED

- Transmitter/receiver.
- 2-standard size servos.
- 6-cell battery pack.
- Battery charger.
- Paint for styrene bodies.

inserting all of the plastic and metal parts into each of the chassis halves. I can tell you from experience that it's no fun yanking the chassis apart just to stick in a plastic spacer that you overlooked.

• **Glue those tires!** Trust me, those big meats will rotate on the rims as soon as they get a little dusty, and you'll be wondering where all of the go-power went! Use CA on the rim/tire seam to ensure that the tires stay where they belong.

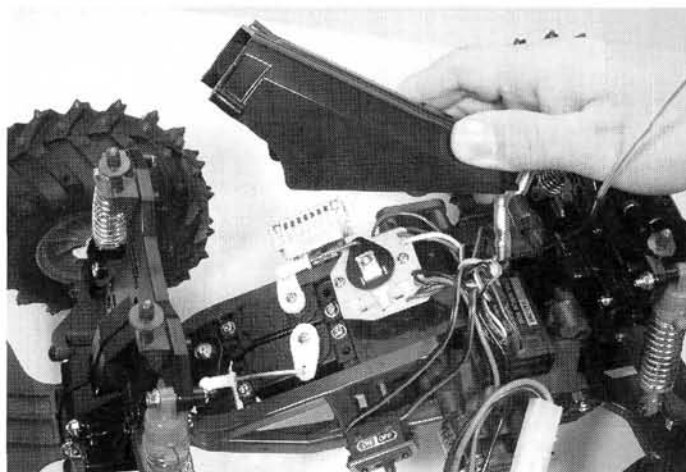
TAMIYA KING BLACKFOOT

shock tower holds much stronger body mounts that can take the punishment typically meted out by novice drivers.

The space frame-type plastic chassis will look familiar to anyone who has ever seen a Blackfoot or a Frog. The classic bar-type servo mounts provide secure bracing and prevent the chassis from twisting under stress. The revised steering linkage and the two-piece suspension arms look more like today's modern designs than something from the mid-'80s.

Although the coil-over shocks aren't oil damped, the greased rubber tubes inside the shock bodies do a pretty good job of slowing the bouncing. Be sure that you don't confuse the front and rear springs, however, as they provide substantially different rebound rates, even though they look very similar.

Many King Blackfoot owners will be entry-level novices who purchase the most economical and basic radio system they can find. Since the kit comes with a



The mechanical speed control comes with the kit and, if properly maintained, should provide years of 3-speed use.

usually develop a fair amount of slop as they wear out. If you can afford a set of bearings when you buy the kit, I suggest that you buy them, but it's no big deal to install the dozen 5x11mm bearings later on. There are eight of them in the hub carriers and front wheels where they're

find groups of R/C devotees; jumping off makeshift ramps, running impromptu races with other cars and generally having a great time.

Sure enough, when I arrived at the elementary school playground, the kids and adults all came over to see what was going on. The new King generated a lot of excitement. I must have had a dozen or more neighborhood kids and adults standing in line waiting to try their hand at running my bright yellow truck. There's something about the King that makes it very approachable; at the same time, the truck is so darn durable that I wasn't concerned about the abuse heaped on it by all of those beginners. I like to think that our hobby got a few new converts that day!

The Hitec Lynx radio did a super job, sending flawless signals through eight battery packs' worth of fun at the hands of many different drivers without a whimper. If you're looking for a good value in a new radio system, you should check this one out. The King is shipped with a set of tires that look suspiciously like the ones that came on the Monster Beetle. The V-shaped treads are deep enough to cut through soft sand or dirt, and the small spikes provide sufficient traction even on bumpy, rutted soccer and baseball fields. Ground clearance? The King's got tons of it. I didn't encounter anything during my testing that even scratched the skid plate in the center of the chassis. This is good stuff!

FINAL THOUGHTS

Overall, I'm pretty impressed with Tamiya's latest iteration of the venerable Blackfoot. This easily built truck performs at a level that belies its cost and it manages to look good enough to please modelers of all ages. The King Blackfoot continues its legacy as one of the finest recreational basher trucks available today!

**Addresses are listed alphabetically in the Index of Manufacturers on page 193.*

Likes

- Able to take a pounding.
- Looks really cool.
- Easy to build; easy to maintain.
- Lots of fun to run around the neighborhood.

Dislikes

- Still a lot of bump-steer up front.
- Tamiya should have chromed the roll bar for a brighter look.

3-step forward and reverse mechanical speed control that uses a separate resistor, any brand of radio with standard-size servos will work just fine. I chose one of Hitec's* Lynx AM radios and used the included 303 servos. Since Hitec's servo output shafts have a different spline pattern from the Futaba* and Airtronics* arms that come with the kit, I used the servo horns that come with the radio setup. (Given the rising popularity of Hitec's radios, hopefully, manufacturers will include Hitec-pattern arms soon.)

The kit comes with a full set of plastic bushings, which do a reasonable job of reducing rotational friction, but will even-



Yes, it's still a styrene body, but now it's the latest Ford F-150 shell.

pretty easy to get to; only the four inside the transmission may cause you some grief. Since Tamiya sell their bearings in sets of four, you could grab the gearbox bearings right away and do the wheels and axles later.

PERFORMANCE

Rather than run the King Blackfoot in a controlled track environment, I elected to hit the kinds of places in which it would usually see duty: the ballfield, the schoolyard and the park. These are where you'll

the Competition	Traxxas Stampede	MRC MT-10M	Tamiya King Blackfoot	Kyosho Tracker
Wheelbase	11 in.	13 in.	9.88 in.	10.8 in.
Width (F/R)	10.25/11 in.	13/12.875 in.	11.75 in.	11.6 in.
Weight	4 lb., 8 oz.	4 lb., 2 oz.	5 lb., 2 oz.	3 lb., 12 oz.
Diff type	Gear	Ball	Gear	Gear
Chassis	Molded tub	Molded w/upper brace	Space frame plastic resin	Plastic tub
List price	\$180	NA	\$220	\$169.99
Available at	\$100	\$100; \$175 (RTR)	\$129.99	\$109.99
Reviewed in	3/95	5/97	2/98	5/94

**Prices vary with location.*

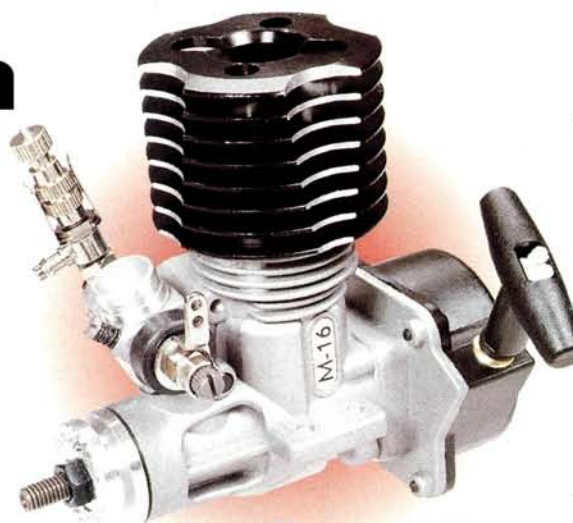
thrash
TEST

1/10 scale electric

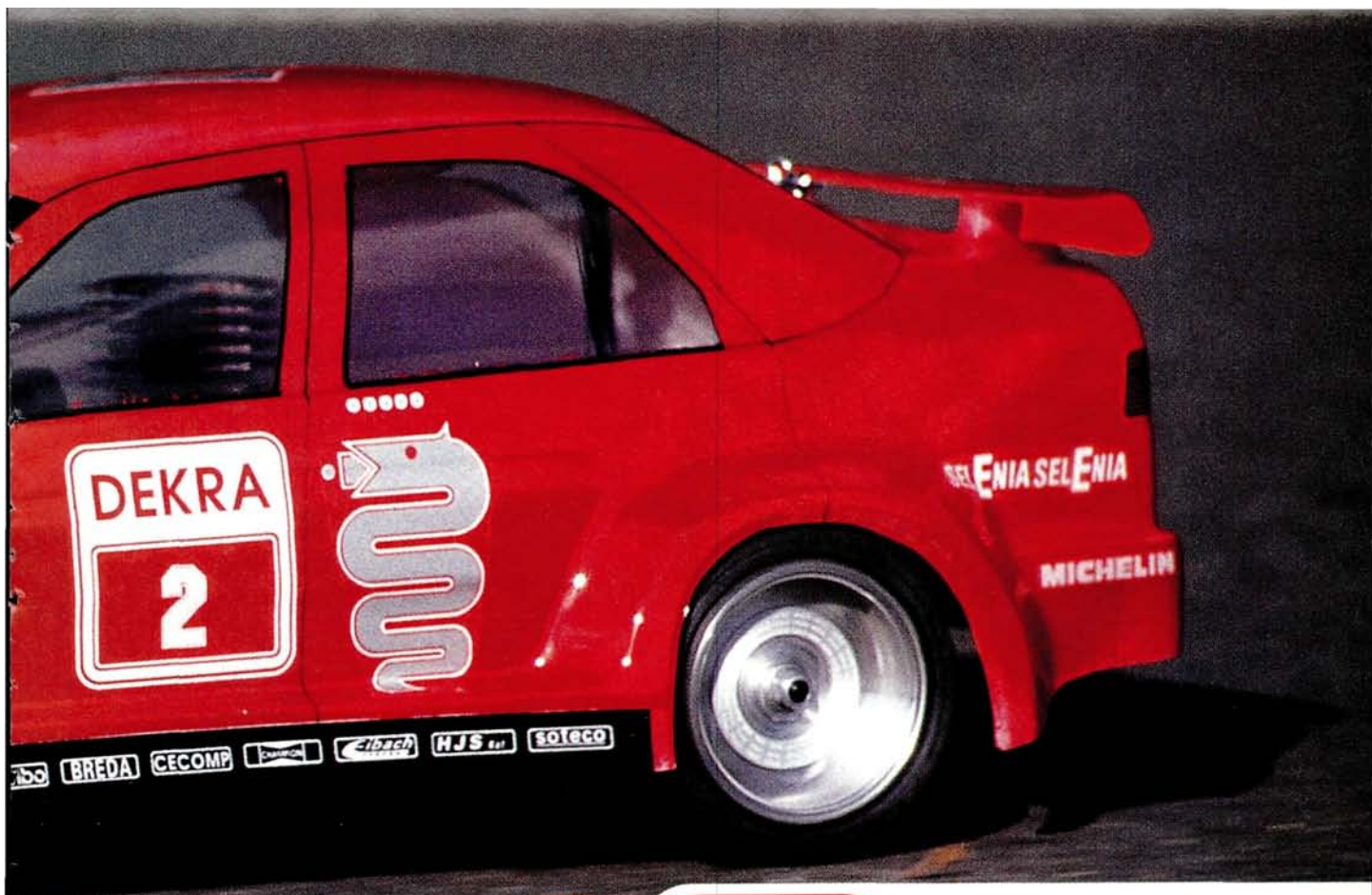


MEGATECH **Alfa Nitro** by Peter Vieira **Touring Sedan**

MEGATECH*? MEGAWHO? What you see here is a brand-new car company—kinda like Saturn, but these cars are 1/10 scale, and there aren't any "feel-good" commercials. *R/C Car Action* is the first to have a look at the new Megatech nitro machine, and if our test vehicle is any example, the name "Megatech" should soon be on the lips of R/C enthusiasts everywhere. If you like your R/C cars fast, fuel-powered, and four-wheel-drive, then the Alfa Romeo Nitro Touring Sedan just might be the car for you!



Megatech M-16



PHOTOS BY WALTER SIDAS

specifications

SCALE 1/10
RETAIL PRICE \$399.95

DIMENSIONS

Length overall 19 in.
 Wheelbase 10.5 in.
 Width (F/R) 9.25 in.

CHASSIS

Type Upper/lower plate
 Material Aluminum

DRIVE TRAIN

Type 4WD shaft driven
 Primary 2-speed clutch bell, 2-speed spurs
 Transmission Universals front drive shafts/rear dogbones
 Differentials (F/R) Bevel gear
 Bearings/Bushings Ball-bearing drive train, bushings in hubs

SUSPENSION (F/R)

Type Independent double wishbone
 Damping Oil-filled, coil-over shocks

WHEELS (F/R)

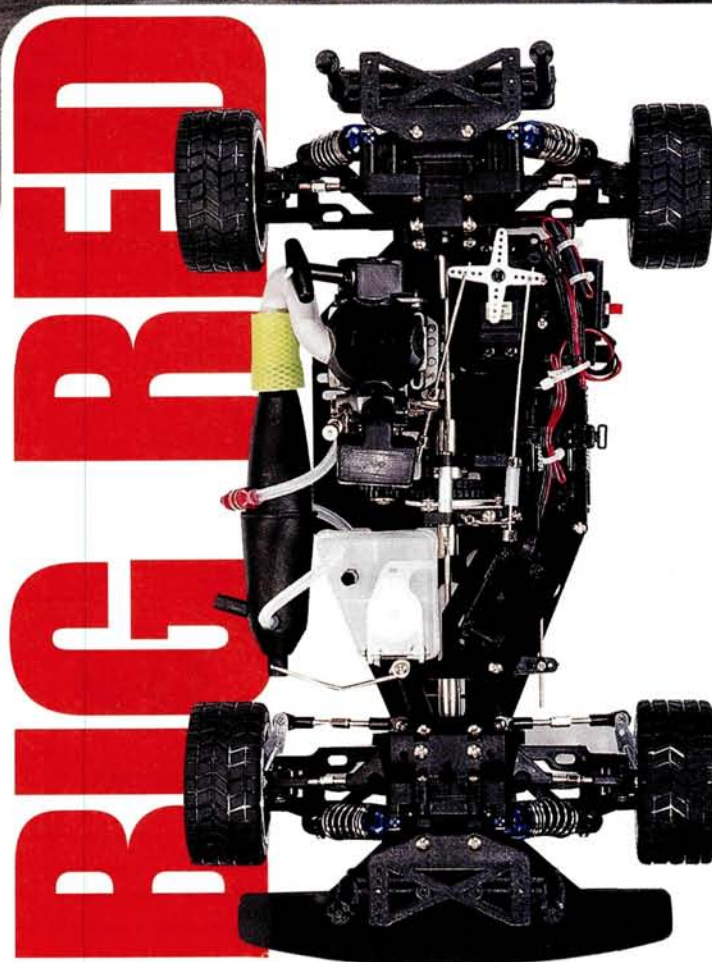
Type One-piece chrome

TIRES (F/R)

..... Soft rubber street tread

POWER

Engine Megatech M16
 Pipe Megatech plastic



MEGATECH ALFA NITRO TOURING SEDAN

THE KIT

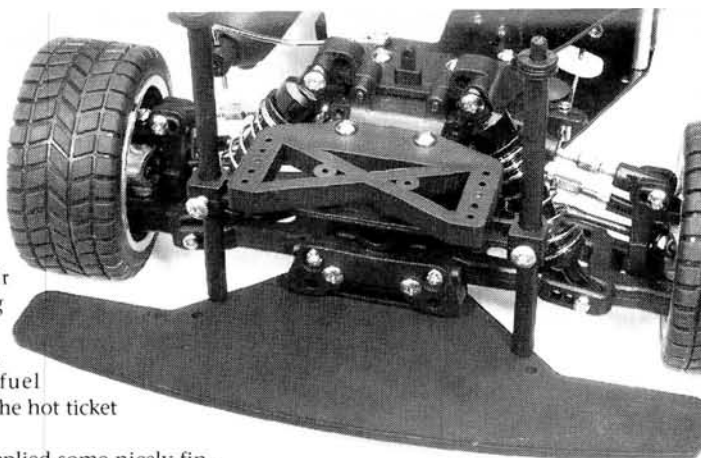
I use the word "kit" loosely, as the Alfa arrives largely preassembled. Once the body has been painted, all that's left to do is install the radio gear, connect the throttle and brake linkages and install the exhaust system. The chassis is well-appointed to boot: turnbuckle upper links, aluminum front hubs, a 2-speed tranny, aluminum shocks, front universals and Megatech's own M-16 pull-start motor are all included. Wow!

The Alfa's chassis layout resembles a scaled-down, 1/8-scale off-roader. Chunky gearboxes dominate the front and rear of the chassis, and each houses a bevel-gear differential. The diff cases both feature an integral ring gear, that's driven by means of a bevel gear which, in turn, is connected to the centrally mounted 2-speed transmission via dogbones and drive cups. The bulkheads that secure the 2-speed unit also house the cam-actuated aluminum disk-brake system. The drive shafts that link the gearboxes and transmission are required to make only the most subtle angle changes; this, in conjunction with the ball bearings that support all the driveline parts, should make for very efficient power delivery.

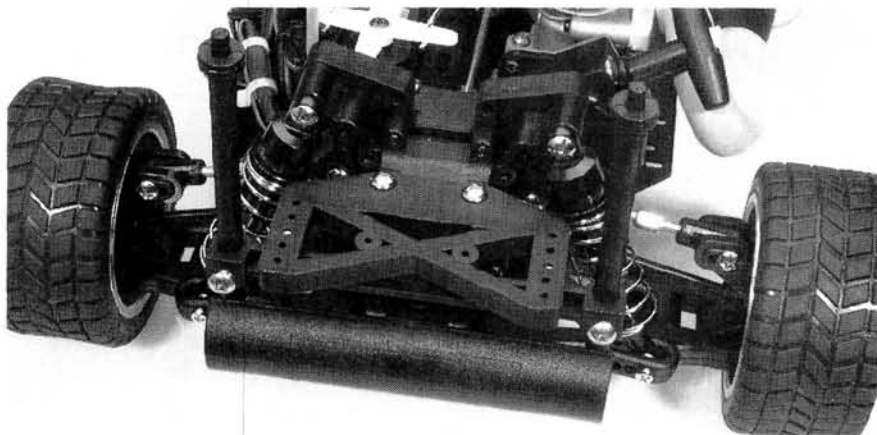
Speaking of power, the Alfa has plenty of it. As the name suggests, Megatech's M-16 engine displaces a whopping .16cc—enough to secure engine-size bragging rights over other nitro-powered sedans. The engine features a nicely machined heat-sink head, a rotary carb, a robust pull-starter and true ABC (aluminum piston in a brass sleeve, which is chrome plated) construction. Megatech includes an alu-

minum header and a plastic tuned pipe to handle the exhaust gases, while incoming air is scrubbed by a foam-element air cleaner. Completing the power package is an oversize, primer-equipped fuel tank that looks like the hot ticket for long run times.

Megatech has supplied some nicely finished dampers to help keep the car planted over bumps. The aluminum shocks are anodized in a rich cobalt blue and feature threaded bodies with knurled aluminum preload adjusters. The shocks arrive conveniently pre-filled, although my sample units did have some air trapped inside that compromised their smoothness. Megatech's suspension



Above: Megatech seems to think I might hit something with its car. Who, me? Never! Note the wide flats on the turnbuckles and the chunky body-mount platform. **Below:** now that's a wide-track rear end! It's no wonder that the Nitro Tourer is so unflappable—and unflippable.



Building & Setup Tips

The Nitro Tourer arrives just about ready-to-run; all you need to do is to install your radio gear, hook up the throttle and steering linkages, paint the body and glue on the tires. That doesn't leave much room for building tips, but I can offer you this:

• **Wheel assembly:** the deep-dish chrome rims feature pressed-in hubcaps that are meant to resemble alloy wheel spokes. A hole in the center allows access to the wheel's mounting nut, but this hole is a scotch too small to allow the included box wrench to pass through it and reach the wheel nut. Use a ream to enlarge the hole before you glue the caps into place.

• **Thread lock:** it's a good idea to back out all of the metal-to-metal fasteners, apply thread-locking compound, and then re-tighten. You don't want your new nitro machine to be shedding parts all over the parking lot!

• **De-burr the chassis plates:** the aluminum Nitro Tourer's chassis plates have

burrs left over from the stamping process. Although the parts won't cut you, the sharp edges make handling the car a little uncomfortable. Take a minute to knock off the burrs with a fine file.

• **Bend the brake linkage:** with my radio setup, the wire rod that actuates the disc brake was hitting the steering servo before it could apply full braking power. Give the rod a kink to help it clear the servo case. Believe me, you'll need the Megatech's brakes!

• **Fuel line routing:** the fuel tank's bottom nipple will send the fuel line straight into the flywheel if left unchecked. Use a few zip ties (not too tight!) to keep the line from getting buzzed by the flywheel.

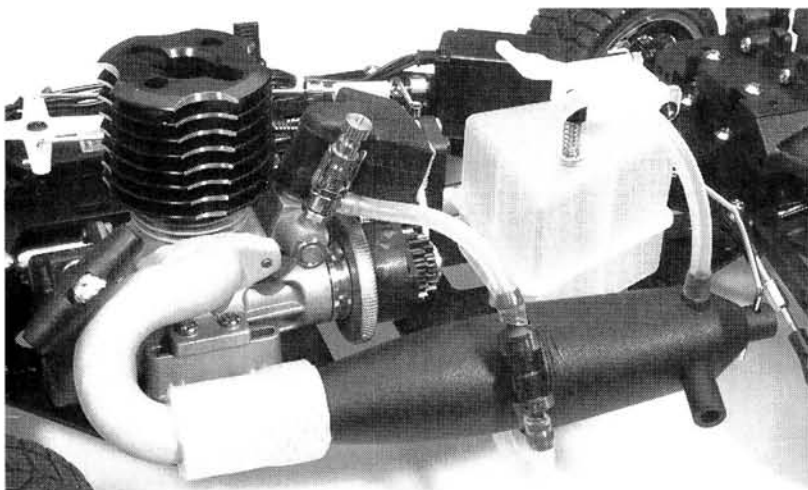
THINGS YOU'LL NEED

- Fuel.
- Spare glow plugs.
- Glow-plug heater.
- Two-channel radio with two servos.
- Four AA batteries or receiver Ni-Cd.
- Paint for polycarbonate body.

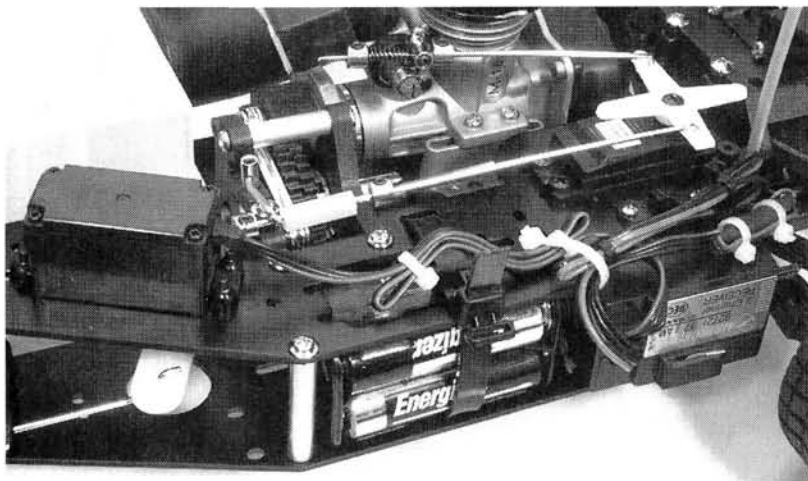
FACTORY OPTIONS

- Aluminum rear hubs with bearings—part no. MTCSECB346.
- Aluminum lower suspension arms—MTCSECB347.
- Aluminum hub carriers—MTCSECB348.
- Ball bearing aluminum steering bellcranks—MTCCB218.
- Steel spur gear for two-speed 40/43T—MTCCB312.
- Foam bumper—MTCCB340.
- Yellow option shock springs—MTCCB344.

MEGATECH ALFA NITRO TOURING SEDAN



The M-16 engine proved to be as reliable as it was powerful. The awkward fuel line routing was necessary to keep it out of harm's way; the fuel tank's lower nipple places the fuel line dangerously close to the flywheel.



Likes

- Blistering top speed.
- Wide-track suspension is super stable.
- Extremely tough!
- Robust M-16 engine.



Dislikes

- Appearance isn't very true-to-scale.
- Hubcaps interfere with maintenance.

The Airtronics AM gear performed well. Note the brake linkage; it will hit the steering servo before reaching full extension unless you perform a little minor surgery; a slight bend is all it needs.

setup is unconventional for a touring car; there's more than an inch of suspension travel, and the shocks are very lightly damped. I'm expecting a lot of body roll, but the Alfa's bump-eating prowess should put Cadillac to shame. The suspension isn't the only component capable of taking hard knocks: large bumpers grace each end of the car to shrug off the occasional bump from a curb or a competitor.

The included Alfa Romeo body is nicely molded, if somewhat less than scale, and features overspray film for easy finishing. The included decals re-create the basic elements of the full-scale racer; with a simple coat of red paint, the Megatech machine becomes a good-looking sedan. Satin finish "chrome" wheels add to the car's good looks and feature pressed-in plastic spokes. I actually liked the wheels better without the spokes, but hey, that's me.

TEST GEAR

I chose to use an AM radio in the Megatech Alfa. Airtronics' Rival RV2P got the nod, as it has proven to be reliable, comfortable and glitch-free through many club races. The Rival also includes a 4-cell battery box and switch harness, and both are required to complete the Alfa. Also included is a pair of 94102 servos, which were recruited for throttle and steering duty. Dynamite's Blue Thunder 20-percent nitro fuel filled the tank via a Megatech fuel bottle (sorry, not included with the kit).

PERFORMANCE

Before I even had the Megatech Nitro Tourer on the ground, I had plans made to lower and stiffen the suspension. After driving the car, I threw those plans out the window! The Megamobile is a lot of fun right out of the box. First of all, it looks cool. With those bulging fenders and big tires, the car has an aggressive look (scale, *schmale!*). I was also impressed by the luxu-boat ride; although the Nitro Tourer lacks the laser-precise feel of a race-prepped sedan, it's a lot of fun to drive. It hangs its tail out in the turns with a lot of body roll and will four-wheel drift forever. Even when you're just tooling around, the Nitro Tourer looks as if it's really hauling!

But the car doesn't just look fast; with the grunt of the M-16 engine and the 2-speed tranny, it is fast. Unless you're used to driving 1/8-scale on-road cars, the Megatech should be plenty quick enough to whiten your knuckles. Although the shift point of the 2-speed tranny is easily adjusted, without any wrenching, my sample car kicked into second gear just as the engine wound out. Speaking of wrenching, or lack thereof, I never had to take a tool to the Megatech even after eight or 10 tanks' worth of fuel. Aside from the occasional needle-valve tweak, all I did was pit for fuel and run. And run and run! The M-16 engine started easily and never hiccupped. After an afternoon with the Megatech Nitro Tourer, you'll probably agree: this sedan is mega-fun.

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.

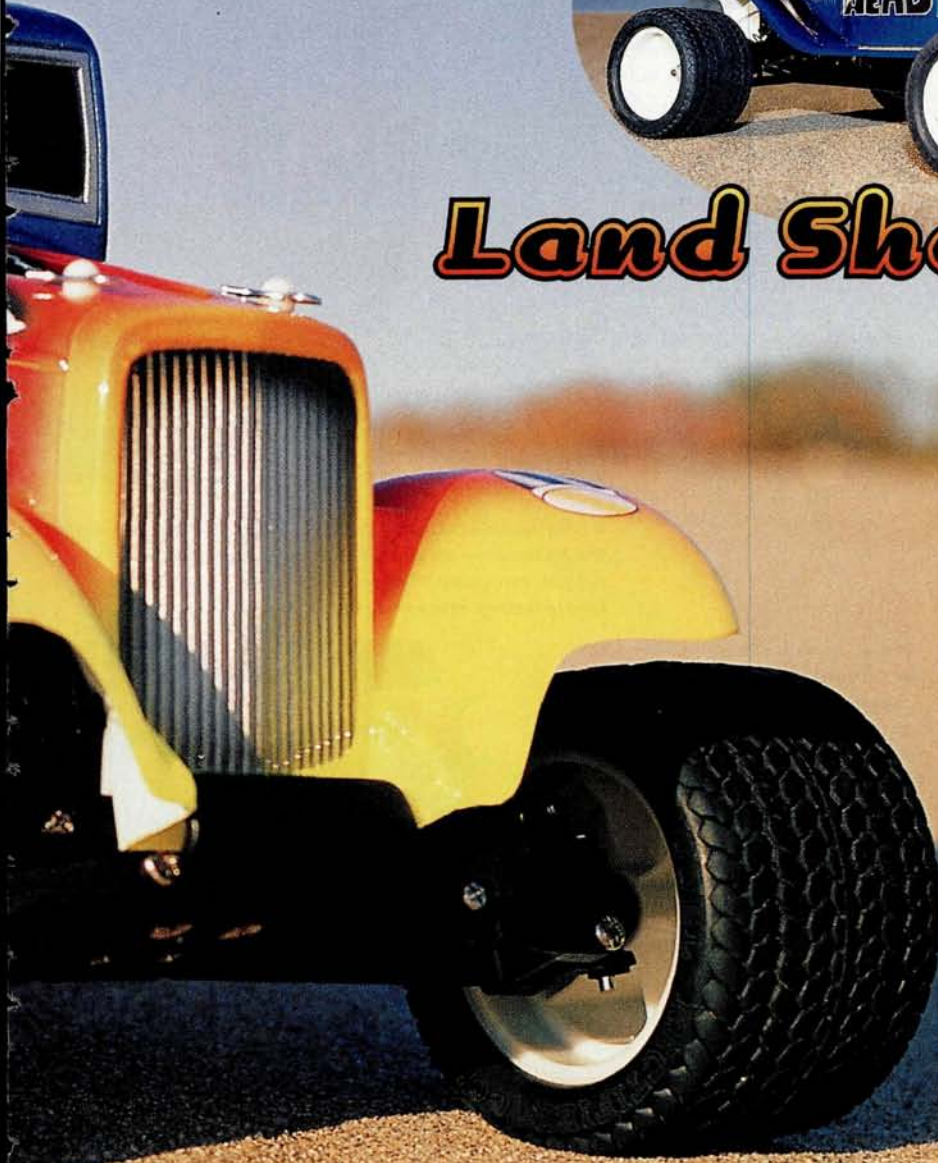
the Competition	HPI Nitro RS4	Kyosho Pure Ten	Megatech Nitro Tourer
Wheelbase	10 in.	10.4 in.	10.5 in.
Width (F/R)	7.75 in.	8.12 in.	9.25 in.
Weight	3 lb., 4 oz.	3 lb., 8.6 oz.	4 lb., 4 oz.
Diff type	Bevel gear	Bevel gear	Ball
Brakes	Disk	Disk	Disk
Exhaust	Expansion	Expansion	Expansion
Price	\$329	\$299.99 (w/o options)	\$399.95
Available at*	\$219*	\$219.99*	\$249.95
Issue reviewed	6/97	9/97	2/98

*Prices may vary depending on location.



MRC **Hammerhead** by Cynthia White

BALANCE MUST HAVE BEEN the name of the game for the engineers who worked on the design of MRC's* new Hammerhead. The All-Terrain Hot Rod is a perfect combination of simplicity and durability that's great for beginning truckers, yet it also has the features that will make it perform proficiently on just about any surface. Inside the box, you'll find an assembled truck—with corresponding Futaba* 2PCKA radio gear installed—with wheels and tires mounted and a clear Lexan body. You'll be in the backyard or at a nearby piece of pavement with your Hammerhead in just the amount of time it takes you to paint the body. Before you pick one up and get out there, though, it might be worthwhile to examine the components of the Hammerhead that make it such a solid, versatile performer ... OK, we'll understand if you want to play a little first!



SCALE 1/30
STREET PRICE \$95 (kit), \$175 (RTR)

Length overall 16 in.
Wheelbase 10.5 in.
Width (F/R) 11.6/12.5 in.

WEIGHT (gross, RTR)..... 3 lb., 15 oz.

Type Molded w/upper brace
Material Fiber-impregnated resin

Type	Warp Speed Tranny (sealed gear)
Primary	Pinion/spur
Transmission	Dogbone/axle
Differential(s)	Ball
Bearings/bushings	Bushings

Type Lower suspension arm
w/molded upper link

Type One-piece plastic
Dimensions (DxW) 2x2.25 in.

Motor Standard 540
Battery Not included
Speed Control Mechanical 3-step type

PHOTOS BY WALTER SIDAS

MRC HAMMERHEAD

THE KIT

Similar to MRC's entry-level Vortex buggy, the Hammerhead is built around a fiber-impregnated resin compound chassis. A molded well allows for the easy addition of a 6-cell stick battery pack. A pivoting battery stay is molded directly onto the chassis to keep the battery pack in place. Side wells on both sides of the battery tub provide plenty of space toward the rear of the chassis for the receiver, throttle servo and on/off switch.

At the heart of the Hammerhead's Warp Speed transmission is a ball differential that mates with an idler gear and settles inside a two-piece, molded gearbox. The aluminum motor plate separates the gearbox from a mid-size, 78-tooth spur gear that meshes with a 23-tooth pinion gear. Three different spur gears are included with the kit to accommodate various driving needs, but the assembly manual outlines the setup for the 78-tooth spur; it's the most adaptable to varied driving conditions and styles. The gears all rotate from the power of a 20-turn, 540-size motor. My first instinct told me that a more souped up motor might be recommended if more zip is desired in the future.

Suspension duties on the Hammerhead are managed by four coil-over, oil-filled shocks with adjustable shock collars. The front and rear lower A-arms are molded from fiber-impregnated nylon and seem to be both durable and rigid. Multiple mounting holes where the upper links and shock ends connect to the shock tower (on all four corners) allow subtle suspension-geometry adjustments. Centered on molded plastic shock towers, upper links and shock bodies, the entire suspension system is fantastically durable, and that's especially important, because what's the use of owning and running an "all-terrain" if you can't knock it around a little?—all right, a lot!

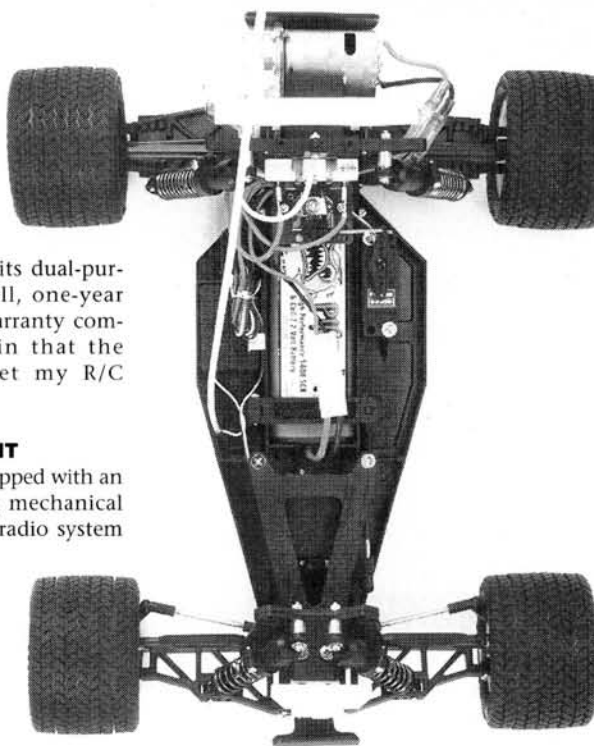
As with the suspension system, MRC has engineered some initial binding into the bellcrank steering system to allow the moving pieces to settle into positions that will allow maximum freedom of motion, once the truck has been run awhile. Threaded rods connect from the included servo-saver to the steering blocks, and these allow for toe-in/out adjustment.

A mechanical speed control adequately manages throttle delivery. It fits cleanly at the rear of the truck and is attached securely to the rear shock tower. Though I am only an occasional R/C'er, one of the first modifications I would make to this truck would be to replace the mechanical speed control with a quicker, smoother ESC.

The Hammerhead's front and rear bumpers (which you'll need, if you drive like I do), efficient 3-gear transmission and gearing options all make the Hammerhead a stand-out. The ingenuity behind its dual-purpose design and MRC's full, one-year crash-damage protection warranty combined to make me certain that the Hammerhead would meet my R/C driving standards.

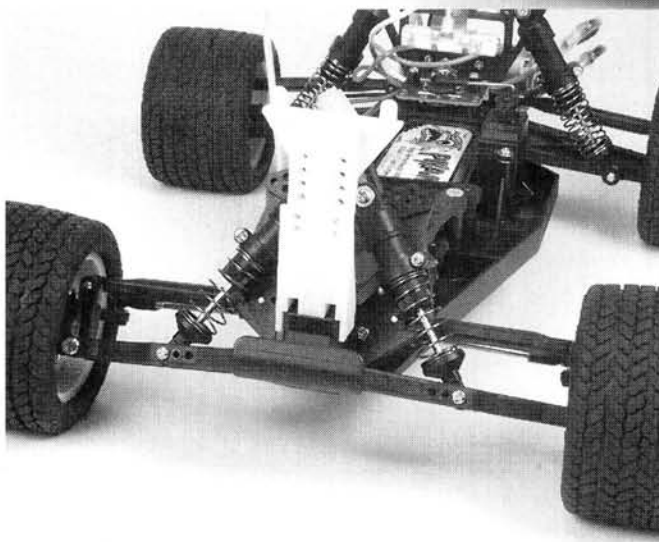
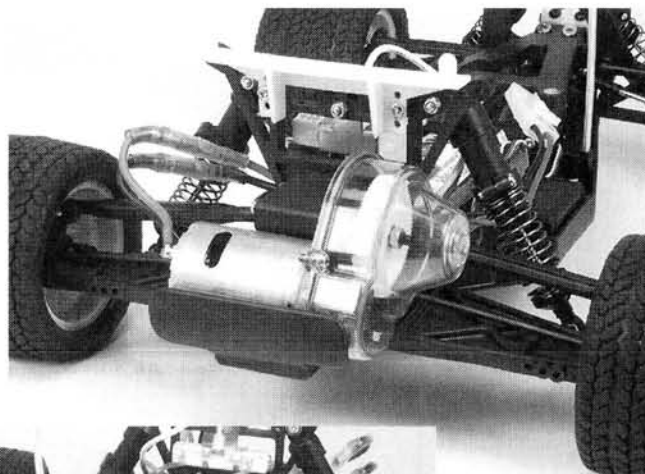
TEST EQUIPMENT

The Hammerhead comes equipped with an MRC forward and reversing mechanical speed control and a Futaba radio system with two S3003 servos installed on the chassis. I also added Dynamite's* 1,400mAh Piranha 6-cell stick pack to get the Hammerhead going. MRC's new Super Brain 809 Delta Peak battery charger handled the charging responsibilities without any problems.



A solid wheelbase and accurate side-to-side tracking add to the Hammerhead's overall durability. Factor in these rugged, last-you-a-lifetime tires, and you won't find a longer-lasting, more versatile anywhere.

The motor is mounted at the rear of the chassis and is braced by a molded piece of plastic. A clear plastic gear cover keeps dirt and debris from mucking up the works inside. You can tell this is an MRC design through and through.



Take a good look at the Hammerhead's rock-solid suspension system. The prebuilt Hammerhead had far too much preload in the shocks and allowed very little down-travel in the hubs; a little adjustment to the shock collars was all it took to make suspension as smooth in the turns as it is on the straights.

MRC HAMMERHEAD

PERFORMANCE

The first testing ground for the Hammerhead was the long, wide, carpeted hallway of our offices—not recommended—during lunch hour. I didn't fidget with servo or throttle trim before letting it rip, and the Hammerhead had a mind of its own ... without any pressure on the trigger, the truck moved full throttle down the hall. I regained control by throwing it into reverse; the truck slowed down and started back to me (backwards, of course). Once I had adjusted throttle trim, the Hammerhead was significantly more controllable. I didn't worry about glitching and unsteadiness at that point, though, as my running conditions were less than ideal.

The next time I drove the Hammerhead was on my bumpy, pebbled driveway. The Hammerhead conquered

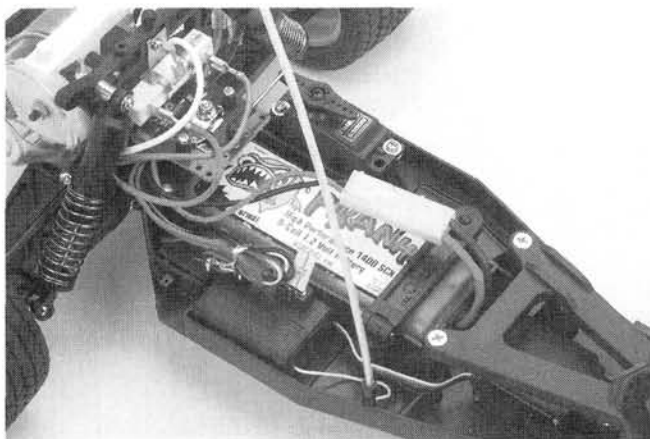
The Hammerhead's versatility makes it the perfect all-terrain for beginning R/C'ers and well-seasoned racers

the course's gravel and dirt without a problem and ran steadily. Even after bumping into a stone wall at close to full throttle, this solid truck was still in one piece; not even bruised. The throttle seemed somewhat twitchy and despite fidgeting with throttle trim, I still had difficulties with the truck's speed control.

At times, I couldn't get the truck to slow down in forward, even when off-throttle and, as in the office hallway, I found that reverse was the only way to slow the truck. At other times, I had problems

slowing the truck when it was in reverse. I blamed most of these glitches on the mechanical speed control—and, of course, on my less-than-Masami-like driving skills.

The 540 motor and gearing combination were sufficient to meet my driving ability but, if speed is what you're looking



With the body removed, the simple, durable interior design is visible. A molded tub with pivoting battery stay holds the battery in place, and outside wells contain the electronics. This view lets you see the durability-enhancing sub-chassis as well as some really neat wiring. God bless prebuilt kits!



Building & Setup Tips

Even though the Hammerhead comes fully assembled, here are some tips to make it a little simpler to get it going.

- Overcome the temptation to throw away the instructions just because the truck is prebuilt. Read them; you might learn something!
- You may need to adjust the steering and throttle trim to center the servo in the neutral position.
- Note that initially, there will be some temporary binding in both the front and rear suspension and steering assemblies. This is a design feature that allows the moving parts to seat correctly during break-in.
- After you've run the Hammerhead two or three times, the ball differential will have seated. At this point, you may have to tighten the ball diff slightly.
- If you choose to change the shock pistons, remember, for smooth operation of the shocks, you must trim off the excess flashing. A fingernail file works great for this.

FACTORY OPTIONS

- Full ball-bearing set—part no. 9426001.
- Slipper clutch—9456015.
- Spur-gear adapter set*—9456016.

**Spur-gear adapter set is to be used only with MRC's slipper clutch.*

THINGS YOU'LL NEED

- Paint for Lexan body.
- AAs for the transmitter.
- Ni-Cd battery pack.
- Hobby knife.
- Battery charger.



Likes

- Complete assembly equals less time with the Phillips-head and more time with the transmitter.
- Solid suspension system makes the Hammerhead a standout at the entry level.
- Sub-chassis gives the front end stability if you decide to take the Hammerhead off-road.
- Built-in resistance in suspension and steering systems allows the moving components to seat properly during break-in.
- Three words: crash damage protection.
- Steering response in reverse allowed amazing 007-style driving moves!



Dislikes

- All good R/C'ers deserve an ESC.
- Smelly tires!
- Foam inserts would have been a nice touch.

for, you'll probably want to throw in a hotter motor.

The Hammerhead reacted quickly and tightly to commands from the transmitter and had no problems with side-to-side tracking. Reverse steering response was sensational, and I quickly became master of sweet-looking—although unintentional—"007" chase-scene moves. I did find that the inside wheels were elevating slightly when I took hard corners and after investigating, I realized that the shocks were set up with way too much preload. I loosened the shock collars, charged up the pack and hit the pavement again. That's all it took. The inside tires dug into the pavement, and the truck cornered with ease at speed.

FINAL THOUGHTS

When I think of "Cindy's ideal R/C car," I imagine models of the cars that I would like to drive in full-size—think touring car—and needless to say, there's not a big chance you'll find me parallel parking a monster truck. But I loved the Hammerhead. Sure, a hotter motor could make the truck run a little faster but its uncompromising versatility makes it the perfect all-terrain for beginning R/C'ers and well-seasoned racers alike. It drives like a sedan but is rugged enough to handle whatever falls into its path. And it offers one more advantage: next time you're standing in the hobby shop with \$150 in your hand, you won't be faced with a decision; you can have a street machine and a truck, all in one!

**Addresses are listed alphabetically in the Index of Manufacturers on page 193.*

RACING

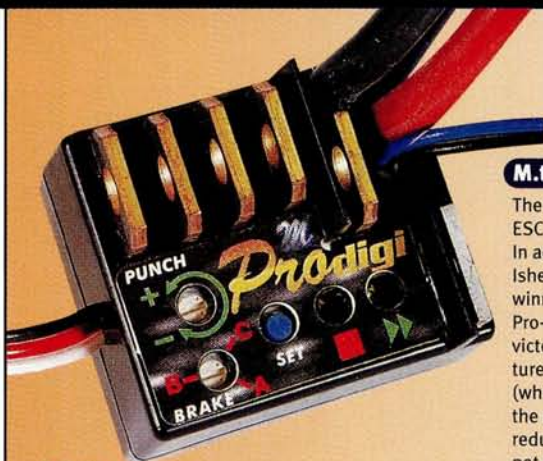
YOUR ULTIMATE

by Peter Vieira

More than any other component, the electronic speed control (ESC) has transformed electric racing. Before the arrival of the ESC, the typical R/C car was bogged down with the weight of a throttle servo, a mechanical wiper unit, resistors and a 4-cell pack for the radio gear. In addition to the limitations imposed by the excess weight, vehicle design was hampered by the vast amount of chassis space the throttle gear required. As an added negative, mechanical controls were a pain to adjust and required careful adjustment of servo throw for proper operation. The ESC changed all that. Suddenly, the throttle became an innocuous little box that could be placed anywhere on the chassis without concern for linkages or servo arms. The cars were lighter and setup was easier; with a twist of a few adjustment pots, the throttle was ready for action. And performance? A revelation. Throttle action was smooth, consistent and instantaneous, and batteries lasted longer, allowing taller gear ratios and higher speeds.

Fueled by competition both within the industry and on the racetrack, ESC technology has exploded since those early days. Just as the first ESCs were revolutionary compared with their mechanical counterparts, today's ESCs represent a quantum leap from the electronic controllers of yesteryear. The new breed of ESC is smaller, lighter, more efficient and—thanks to microprocessor technology—smarter than ever.

We've gathered the latest hardware from the biggest names in ESC technology today (as well as some hot newcomers) and put them together with all their specs to form a comprehensive guide to racing speed controls. If there's an ESC that can get you into the winners' circle, it's here! Be sure to also check out the glossary of terms and the sidebars that explain some of the new technologies now available as well as our interview with four leading ESC designers.



features

- Adaptive Punch Control.
- Brake adjustment pot.
- Schottky diode.
- Motor capacitors.
- Setup tool.
- Decal sheet.
- Receiver plugs.

M.troniks Pro-digi

The competition-proven Pro-digi is a tiny ESC with big features—and big credentials. In addition to powering Richard Isherwood's European championship-winning Tamiya Super Touring car, the Pro-digi has also secured British national victories in 1/12-scale racing. Unique features include Adaptive Punch Control (which is not a current limiter but allows the user to finely adjust "punch" without reducing top speed), a brake adjustment pot for easy adjustment of braking action and "feel" and push-button setup for a quick trip from the bench to the starting line.



Hitec HFX

Hitec steps up to the needs of the racing market with the new HFX ESC. This new unit has a rugged feel and a chunky current-limiter knob for easy adjustment. The HFX employs the latest MOSFET technology for silky-smooth throttle action, and a silicone boot joins the FETs with an integral heat sink. In addition to its heat-conducting properties, the pliable silicone boot also helps protect the FETs from shock. The HFX features soft, flexible, 12-gauge wire, and an additional lead for FET-boosted servos is included.

features

- Universal receiver plug.
- Silicone heat-sink boot.
- LED throttle indicator.

GLOSSARY OF TERMS

Cells: The number of cells the ESC can operate with.

Resistance: the electrical resistance within the ESC's transistors. The lower the resistance, the more efficient the ESC will be.

Current limiter: this device allows the user to reduce the current delivered to the motor in an effort to extend run time. A current limiter can also be used to reduce wheelspin on slippery tracks, although this can also limit top speed.

Wire gauge: wire thickness is measured by gauge; most ESCs use 12-, 14-, or 16-gauge wire. The lower the number, the thicker the wire. Racers prefer heavier wires for their low electrical resistance.

Three- and four-wire hookup: entry level ESCs are often four-wire hookup, meaning there are four wires coming out of the ESC; a positive and a negative wire for the battery, plus a positive and a negative wire for the motor. A three-wire hookup retains the individ-

ual leads for battery negative and motor negative, but uses a single positive lead for the battery and motor.

Frequency: to oversimplify, an ESC controls motor speed by cycling the motor on and off many times per second. The number of cycles per second is the frequency. It is generally accepted that higher frequencies result in smoother throttle feel.

Forward current: the maximum continuous current the ESC can deliver to the motor for forward throttle.

ESC GUIDE

SPEED SOURCES

HPI Pro Control

Here's a logical choice for your RS4 Pro! HPI's Pro Control lives up to its name with plenty of high-end features. High-frequency operation, thermal-overload protection and low-voltage operation make the Pro Control an efficient performer. A smooth torque limiter and single-button setup make this ESC easy to customize for your application, while "secret" programs allow the user to adjust max brake, min brake, and current limiter bypass through the setup button. A Turbo mode is also built in, allowing the Pro Control to limit current for a user-selected number of seconds before switching it off for full-throttle operation.

features

- Schottky diode.
- Setup tool.
- User-selectable "secret" programming.



Keyence A-01 Pro

Although it isn't yet available in the States, Keyence is looking to introduce the tiny A-01 Pro to the American market soon. There's quite a bit going on inside that tiny package; in addition to the usual current limiter function, the A-01 features Dash Power Mode for full-throttle starts with delayed current limiting. The current limiter can also be set low for slippery starts, then automatically switched off after 2 seconds, making full power available for the rest of the race.

features

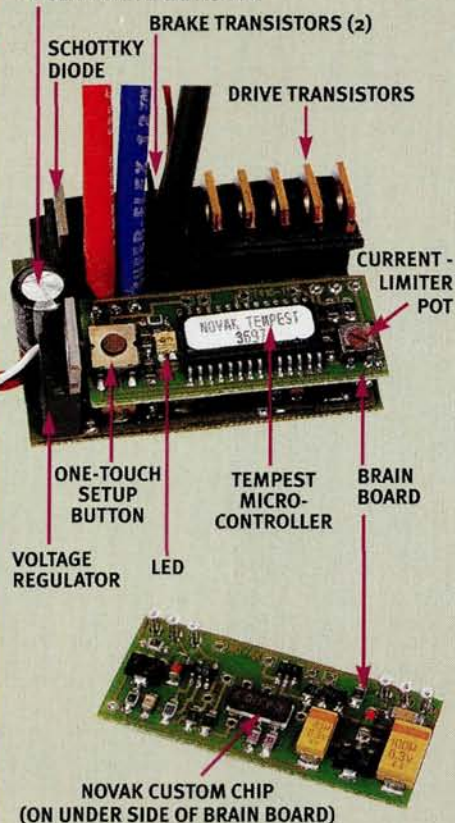
- Extra small.
- Includes heat sink.
- Setup tool.
- Schottky diode.
- Motor capacitors.
- Decal sheet.



INNER WORKS

We opened up a Novak Tempest MAX to show the inner workings of a modern racing ESC.

POLAR-DRIVE CAPACITOR



NOVAK CUSTOM CHIP
(ON UNDER SIDE OF BRAIN BOARD)

Brake current: whenever an electric R/C car is coasting, the motor is not consuming energy; it is producing energy! To brake a motor, the ESC acts as a resistor for the current developed by the motor, which is actually acting as a generator. The figure listed as brake current is the maximum current the ESC can handle from the motor.

Battery Eliminator Circuit (BEC): the name "battery eliminator" comes from the early days of R/C when electric vehicles still

required a 4-cell receiver pack. The BEC in a speed control is actually a voltage regulator that supplies the receiver and servo with the voltage they need to operate.

Motor limit: some ESCs can overheat if asked to cope with the amp draw of modified motors with very low winds, so the manufacturer will establish a minimum number of winds for the motor. Don't try to go lower!

FET servo lead: a lead for use with any FET-boosted servo that requires an external lead.

Push-button setup: this feature allows the ESC to calibrate itself to your radio's neutral, throttle and brake positions via a press of a button instead of relying on potentiometers.

Temperature protection: also known as thermal-overload protection. This feature will shut down the ESC if it overheats due to overuse, a short circuit, or other problems. Once the

ESC has cooled, it will operate normally. If you're getting your ESC hot enough to activate this feature, find the cause and fix it!

Solder posts: virtually all racers trim their ESC wires for the shortest possible run to the motor and battery to minimize voltage losses in the wires. This can present a problem when the ESC is moved to another vehicle; the wires are often too short and must be extended via clumsy splices. Solder posts allow new power

wires to be soldered onto the ESC without opening the case, making for a perfect custom installation every time.

Metal Oxide Semiconductor Field Effect Transistor (MOSFET): these are the "muscles" of an ESC; a MOSFET is a voltage-controlled power device that can handle large amounts of electrical current flow.

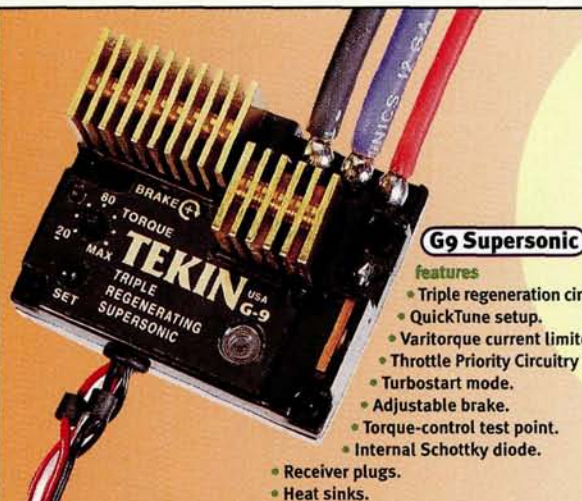
Schottky diode: this component carries re-circulated current from the motor at partial throttle.

CONTROLLER OF THE FUTURE?

Electronic speed control. Kind of says it all, doesn't it? No matter how many "gee-whiz" features are packed into an ESC, it is still, essentially, controlling only speed.

GM Racing's ASP (pictured opposite page, bottom right), however, might be better named an electronic *driving* control rather than a mere speed control. ASP stands for "Active Steering and Power" control—a feature that literally ties the steering system to the throttle: the steering servo is plugged into the ESC! ASP works by means of a piezoelectric gyro within the speed control. The ASP monitors the attitude of the car in relation to the position of the steering servo and the amount of throttle or brake. If the ASP senses the rear end of the car coming around in a slide, it will countersteer and reduce throttle or braking to regain traction; if the car understeers, more steering throw will automatically be dialed in to tighten the line. The sensitivity of the system can be adjusted to compensate for driver skill and track conditions via a pot on the unit's case. Although this technology is not a panacea for bad driving, some of us can certainly use any help we can get.

Note, however, that the ASP feature is not currently legal for use in sanctioned competition under IFMAR rules. This rule may be challenged if more manufacturers follow GM's lead with similar multiple control features. In the meantime, there are no rules against using the ASP in non-sanctioned club races or the battlegrounds of backyards and parking lots. We'll put our sample unit through its paces and let you know how it works.



G9 Supersonic

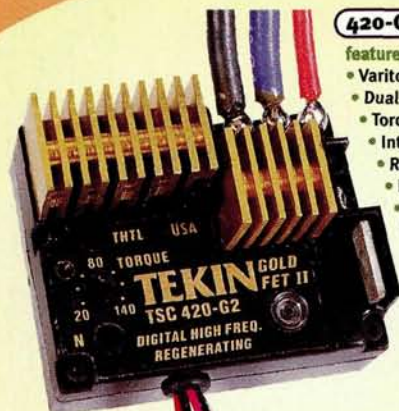
features

- Triple regeneration circuitry.
- QuickTune setup.
- Varitorque current limiter.
- Throttle Priority Circuitry (TPC).
- Turbostart mode.
- Adjustable brake.
- Torque-control test point.
- Internal Schottky diode.

- Receiver plugs.
- Heat sinks.
- Motor capacitors.
- Decal sheet.

Tekin

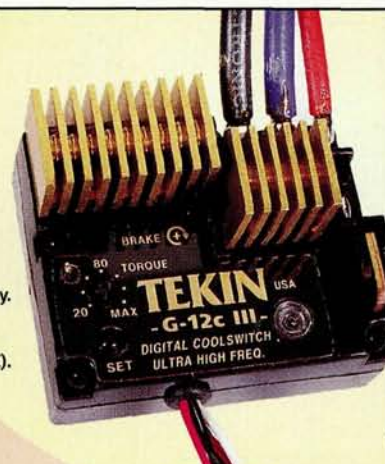
The choice of 4WD World Champ Masami Hirotsuka, Tekin has a reputation built on performance. The new G-10 model features user-set parameters for drive frequency, drag brake, minimum brake, dual current limiting and more, all adjusted without the transmitter. Other features of the Tekin line include throttle priority circuitry for full bottom-end power, solder posts, and QuickTune push-button setup. Turbostart mode delivers full-power starts, then reduces the current to match the current limiter setting. The G-9 Supersonic also features dual current limiters and Triple regenerating technology for super efficiency, cooler running and 5 to 12 percent longer run times, available only from Tekin. Finally, if it's power you crave, Tekin's 112mph 420-G2 can handle a whopping 20 cells—perfect for drag racing and insane speed runs.



420-G

features

- Varitorque current limiter.
- Dual-motor compatible.
- Torque-control test point.
- Internal Schottky diode.
- Receiver plugs.
- Heat sinks.
- Motor capacitors.
- Decal sheet.



G12cIII

features

- New "Masami" World Champion software.
- QuickTune setup.
- Varitorque current limiter
- Throttle Priority Circuitry (TPC).
- Turbostart mode.
- Torque-control test point.
- Internal Schottky diode.
- Receiver plugs.
- Heat sinks.
- Motor capacitors.
- Decal sheet.



G-10

features

- Low center of gravity.
- In-car tuning.
- Dual current limiters.
- Integrated MOSFET cooling.

PRODUCT COMPARISON CHART

Manufacturer	HITEC	KEYENCE	M. TRONIKS	LRP	Indy 600	Indy 400	Indy 200	HPI
ESC	HFX	A-01 Pro	Pro-digi	IPC V6	Indy 600	Indy 400	Indy 200	Pro Control
Part no.	41810	NA	P1900	LRP8067V6	LRP8361	LRP8357	LRP8346	300
List prices	\$159.99	NA	\$199	\$249.50	\$164	\$132	\$99.50	\$209
Cells	4 to 10	4 to 8	4 to 8	4 to 10	4 to 8	4 to 8	4 to 8	4 to 10
Resistance (ohm)*	0.001167	0.001	0.001	0.001	0.0012	0.0022	0.0044	0.0015
Current limiter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wire gauge	12	12	12	14	14	14	14	14
Hookup	3-wire	3-wire	3-wire	3-wire	3-wire	4-wire w/connectors	4-wire w/connectors	3-wire
Dimensions (in.)**	1.6x1.2x0.7	1.2x1x0.5	1.2x1x0.9	1.6x1.25x0.75	1.6x1.4x0.75	1.6x1.4x0.75	1.6x1.4x0.75	1.75x1.25x0.6
Weight w/wires	64 grams	45 grams	45 grams	60 grams	57 grams	49 grams	48 grams	52 grams
Frequency	1830Hz	2930Hz	2500+Hz	3140Hz	2500Hz	2300Hz	2100Hz	2000Hz
Forward current	300 amps	NA	320 amps	590 amps	330 amps	230 amps	150 amps	600 amps
Brake current	100 amps	NA	80 amps	135 amps	100 amps	85 amps	70 amps	135 amps
BEC	6 volts	NA	5 volts	6 volts	6 volts	5 volts	5 volts	6 volts
Motor limit	10-turn	7-turn	None	None	None	11-turn	13-turn	None
Push-button setup	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FET servo lead	Yes	No	Yes	Yes	Yes	No	No	Yes
Temp. protected	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Solder posts	No	Yes	No	No	No	No	No	No

* Transistor and diode rating at 25°C junction temperature. **All ESC measurements are taken from the case and FETs only, without heat sinks or external capacitors in place.



Novak

The distinctive orange color of Novak's speed controls is one of the most ubiquitous sights in racing. Since its debut in the early eighties, Novak has steadily increased the features and complexity of its ESCs to reach its vision of the ultimate speed control: the Cyclone. With its revolutionary flexible programming (altered via Novak's PC software or the Pit Wizard hand-held programmer), the Cyclone can be customized with user-set values for neutral bandwidth, deadband, full throttle, full brake, drive and brake frequency, drag-brake frequency and toggle, and minimum drive. The Cyclone also features Polar Drive for increased range, smoother throttle response and cooler running. Novak's Tempest MAX and Racer EX controls offer Hyperfet performance with extra-low resistance, adjustable current limiters and super reliability. Tempest Max also features Polar Drive.

Cyclone

features

- Polar Drive.
- One-Touch Setup.
- User-programmable neutral bandwidth, deadband, full throttle, full brake.
- User-programmable drive, brake and drag-brake frequency.
- User-programmable minimum drive.
- Taillight kit.
- Motor capacitors.
- Schottky diode.
- Setup tool.
- Decal sheet.



Racer EX

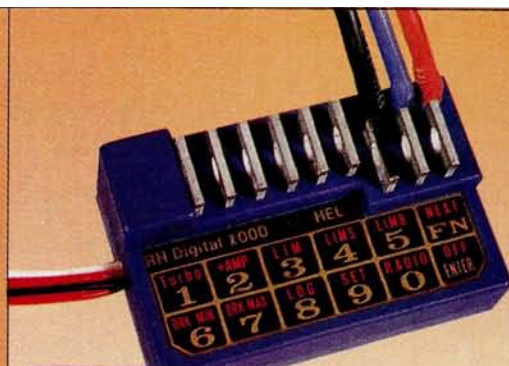
features

- One-Touch Setup.
- Schottky diode.
- Setup tool.
- Receiver plugs.
- Heat sinks.
- Motor capacitors.
- Decal sheet.

Tempest MAX

features

- Polar Drive.
- One-Touch Setup.
- Built-in Schottky diode.
- Receiver plugs.
- Setup tool.
- Motor capacitors.
- Decal sheet.



Galaxy 3000

features

- Keypad programming.
- Adjustable frequency.
- Adjustable brake current.
- Adjustable brake min./max.
- Turbo function.
- Adjustable neutral bandwidth.
- Schottky diode.

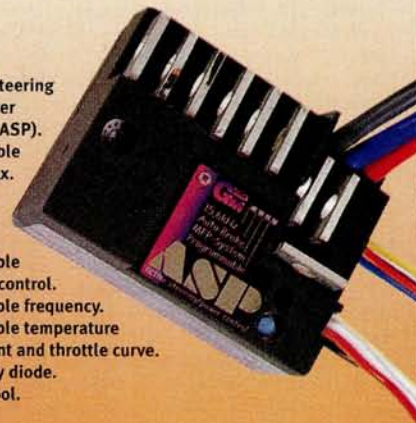
GM Racing

GM's Galaxy and ASP are incredibly flexible, high-tech ESCs. The ASP (Active Steering and Power control) function actually controls the steering servo and automatically adjusts the steering and throttle inputs to correct over- or understeer conditions as the car corners. Many adjustable features are available, including minimum and maximum brake, ASP sensitivity, current limiter and throttle curve. There is even a function for acclimating the ASP to cold-weather racing! The Galaxy offers a built-in keypad for easy, no-guess programming of frequency, current-limiter values, brake-current limiting, neutral bandwidth, turbo mode, and min./max. brake. Like the ASP, the Galaxy can be turned off from the transmitter.

ASP

features

- Active Steering and Power control (ASP).
- Adjustable min./max. brake.
- Adjustable traction control.
- Adjustable frequency.
- Adjustable temperature alignment and throttle curve.
- Schottky diode.
- Setup tool.



GM RACING		TEKIN				NOVAK			
ASP	Galaxy 3000	G-10	G9 Supersonic	G12cIII	P12c	420-G	Cyclone	Tempest MAX	Racer EX
HE2215	HE3000	1420	1122	1121	1212	1320	1765	1760	1655
\$250	\$250	\$199.99	\$270	\$199.99	\$150	\$180	\$249	\$199	\$160
4 to 12	4 to 10	4 to 10	4 to 9	4 to 12	4 to 12	4 to 20	4 to 10	4 to 10	4 to 10
0.001	0.0013	0.001	0.0007	0.0007	0.002	0.0007	0.0067	0.001	0.0014
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
14	14	12	12	12	12	12	12	12	12
3-wire	3-wire	3-wire	3-wire	3-wire	3-wire	3-wire	3-wire	3-wire	3-wire
1.6x1.3x0.9	1.7x1.4x0.9	1.7x1.4x0.75	1.7x1.4x0.75	1.7x1.4x0.75	1.7x1.1x0.79	1.7x1.4x0.75	1.7x1.1x0.79	2.0x1.4x0.7	1.6x1.7x0.65
68 grams	66 grams	45 grams	70 grams	63 grams	63 grams	66 grams	71 grams	72 grams	69 grams
3900-15600Hz	2500Hz	4200Hz	17200Hz	4200Hz	4200Hz	4200Hz	Up to 23400Hz	2500Hz	2500Hz
300 amps	350 amps	NA	400 amps	400 amps	300 amps	400 amps	420 amps	480 amps	350 amps
NA	NA	NA	140 amps	140 amps	120 amps	120 amps	140 amps	210 amps	140 amps
5.7 volts	5.6 volts	6 volts	6 volts	6 volts	6 volts	6 volts	6 volts	6 volts	6 volts
None	None	None	None	None	None	None	None	None	None
Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No

RACING ESC GUIDE

UNDERSTANDING AUTOMATED CURRENT LIMITING AND PROGRAMMABLE BRAKES

Driver who race in the modified classes know how important smooth and consistent driving is for battery conservation and lower lap times. Before you can become a successful driver you must master the art of throttle and brake control, which can take a lot of practice. A racing ESC may help you become a faster and more efficient racer. Many of the ESCs included in this guide have special racing features that give drivers more throttle and brake control than ever before. "Smart" current limiting, user-selectable driving profiles and programmable brakes are just a few of these features. But how do these features benefit the average racer?

CURRENT LIMITING (AKA TORQUE LIMITING)

Most current limiters do exactly what their name implies: they limit the amount of current (power) that goes to the motor. This is a handy feature when trying to conserve battery power or when you need to take the edge off your motor to get power to the ground. Simply by turning a dial, you can slow down your vehicle more easily and drive smoothly and consistently. There is a price, however; if the current limiter is set to a value lower than the motor's amp draw, the motor will not achieve maximum rpm. To combat this, several of the ESCs in this guide have smart current limiters that do more than just restrict the power flow to the motor.

Some ESCs allow you to momentarily bypass the current limiter so that your vehicle receives full power at the start of a race. The moment you let off the throttle (say, to take the first corner) the current limiter returns to the setting you originally selected—no doubt a handy feature! Other models allow you to program the current limiter to shut off completely after a certain amount of time. As you know, batteries usually go flat (lose their punch) 3 minutes or so into a race. Some battery packs will remain "punchy" for longer periods of time, while other batteries will go flat much sooner. Programmable current limiting allows drivers to set the current limiter to turn off (provide full power) as the batteries begin to go flat. This gives the vehicle consistent power from start to finish. Racers who map their cells to find their exact voltage curve find this feature invaluable.

Some ESCs take a slightly different approach to current limiting. These ESCs have special user-selectable driving programs that can tailor the motor's power curve to offer the best possible throttle response and battery efficiency for a particular racing application. As you know, each racing class has its own unique power requirements. Oval racers are more concerned with top-end speed than with bottom-end punch. Off-road racers prefer bottom-end punch to top-end speed. The 1/12-scale drivers prefer more mid-range power with just enough punch to get them out of the corners with authority. Many of the programmable ESCs in this guide can efficiently manipulate the current that flows to the motor to suit any of these driving applications.

You may have noticed the irony that Novak's Cyclone, its top-of-the-line racing ESC, does not have a current limiter. Instead, the Cyclone provides adjustable high frequency and more forward speeds (steps) in combination with its user-selectable driving profiles to provide the highest battery efficiency and the utmost throttle control for a particular racing application. In short, the Cyclone offers so much throttle control that a current-limiting device is not necessary. The Cyclone also has a custom programming feature that allows racers to tailor the ESC to fit their specific needs via optional software that's available through the company.

ADJUSTABLE BRAKES

Many of the ESCs in this guide also feature adjustable brakes. Some allow racers to set the amount of initial braking, while other brakes can be adjusted to offer automatic braking, or drag brakes. Just as racers have individual throttle-response needs, they also have specific braking needs. Some racers like to have maximum braking power ("hard" brakes) so they can toss their vehicles into the corners and essentially use the brakes to steer. Other racers prefer to coast into and power out of corners and feel "soft" braking is the only way to go. Then there are those who like the brake to come on slightly the moment the throttle trigger is returned to the neutral position (drag brake). No matter what your personal braking preferences are, you'll find an ESC in this guide that will allow you to adjust the brakes exactly the way you want.

—George Gonzalez

LRP

LRP's flagship racing ESC is the IPC V6, a steely blue unit with plenty of racing cred; the V6 powered seven of the top eight finishers in the 4WD class at the Worlds! In addition to high-frequency operation and single-button setup, the V6 offers user-selectable brake programs to alter braking power and drag brake, and Start Automatic mode, which doubles the current-limiter value for high power holeshots then returns to the original current-limiter setting. LRP's Intelligent Performance Control (IPC) programming allows the user to tailor the V6's power output by means of plug-in chips. All LRP racing ESCs offer Adjustable Power Control (APC) current limiting, which does not alter top speed.

The Indy line of controllers from LRP offers racing features at a more economical price. The Indy 400 and 200 offer easy plug-in installation with included Tamiya-style battery plugs and bullet connectors. Both units feature adjustable current limiters with APC and single-button setup. In addition to these features, the Indy 600 offers a three-wire hookup, an extra lead to power FET-booster servos and higher frequency operation than the 400 and 200.

IPC V6

features

- Intelligent Performance Control (IPC) program chips.
- Adjustable Power Control (APC).
- Adjustable brake pot.
- Heat sinks.
- Motor capacitors.
- Setup tool.
- Receiver plugs.
- Decal sheet.

Indy 600

features

- Adjustable Power Control (APC).
- Heat sinks.
- Schottky diode.
- Motor capacitors.
- Setup tool.
- Receiver plugs.
- Decal sheet.

Indy 400

features

- Adjustable Power Control (APC).
- Heat sinks.
- Schottky diode.
- Motor capacitors.
- Setup tool.
- Receiver plugs.
- Decal sheet.

Indy 200

features

- Adjustable Power Control (APC).
- Heat sinks.
- Schottky diode.
- Motor capacitors.
- Setup tool.
- Receiver plugs.
- Decal sheet.



(Continued on page 90)

TECHNO WIZARDS Speak Out

There are now more high-quality ESCs on the market than ever before, and the philosophies behind their designs are equally varied. In the course of many phone calls and faxes that helped shape this guide, I posed a few questions to four notables of the R/C electronics field (in no particular order): **Adnan Khan** of Novak, **Jürgen Lautenbach** of LRP, **Kevin Orton** of Tekin and **Mike Merrick** of M.troniks.

There is a trend for very high-frequency operation in the ESC market. How high can switching frequency go? What is the point of diminishing returns?

Adnan: How high can PWM frequency go? That's like trying to predict the future! With our Polar Drive Circuitry we can offer drivers higher PWM operation. Our Cyclone ESC was designed with higher PWM frequencies in mind. Presently, we feel the 23-24KHz region is the upper limit of what most drivers can perceive. We can go higher if needed, but it is very difficult to feel any difference between 24KHz and 35KHz. Brian Kinwald won the 2WD Off-Road World Champs with 11.7KHz, while many oval racers prefer 24KHz operation.

Kevin: We tested frequencies as high as 90,000Hz four years ago—not just in theory, but with actual in-car tests. We found that mid-range frequencies between 4000Hz and 5000Hz provided optimum efficiency and the highest power output, while the higher frequencies suffered excessive inductive switching losses. We use a patented Log/Anti-log throttle to give the smooth response of high-frequency operation with the better efficiency of mid-range frequencies. This is the technology Masami used to win the 4WD World Championships with the G12CIII. Our G9 operates at 17,200Hz, but uses special circuitry to recover power losses, boost run time and increase overall power.

Mike: In 1994, we used 1900Hz at the 1/10 On-Road European Championships to great effect with some special 16x12 motors, but for off-road you can't develop the current quickly enough in the motor during the time when the ESC is switching. It's OK at full power, but the current only flows in the outside of a wire; the higher the frequency, the less the wire conducts, so you have to fit a large storage capacitor inside or outside the ESC to "hold the voltage up," and this capacitor sees extreme stresses. Long power wires make things even worse. You do get a longer run, but only because power to the motor is reduced. There are ways around these problems but we are keeping the solutions close to our chest! Some of the products we manufacture switch at 500,000Hz.

Jürgen: There's been a lot of hype for the really high-frequency numbers, which we have also experimented with. However, we found that more was not necessarily better; our racers felt that about 3000Hz gave the best feel, and we settled on 3140Hz for the final frequency with the LRP IPC V6. There seems to be a consumer demand for the super high-frequency units, and we can certainly build them, but we want to stay true to what our racers are telling us.

Which features do your customers demand most?

Jürgen: Customer demands vary with the class the customer competes in; a 1/12-scale driver might be very in tune with the functions of his speed control and how its features can benefit him; while the off-road racer is looking for an ESC he can forget about—something totally reliable and rugged. The LRP Speedos are designed to meet the needs of all racers by using flexible Intelligent Performance Control (IPC) programming within the speed control, which allows racers to tailor the ESC to their needs without any additional programming devices. Our APC feature also helps because the racer can set the current limiter value as low as necessary without compromising top speed.

Adnan: Size, reliability, ease of use, and adjustable features. It used to be that we had to compromise when designing an ESC so that its performance would accommodate many drivers and many types of racing. You just couldn't satisfy everybody. This is why we made everything programmable in the Cyclone. For instance, oval racers wanted very small minimum drive to be able to roll-start the car up the bank. An ESC made specially for them would be a poor choice for everyone else, but the Cyclone allows the racer to create exactly what he needs in an ESC.

Mike: The overwhelming feedback we receive is that small size and high reliability are musts, while other features seem to go in and out of fashion almost overnight. Obviously, new technology makes things that were impossible yesterday possible today, so I think maybe new technology drives the market along, too.

What have been your company's most important advances in ESC technology?

Kevin: Tekin has made quite a few advances: replaceable wires, Throttle Priority circuitry for more punch, CoolSwitch technology for glitch-free high-speed switching, and reliability under extreme conditions are all important for us. We also build our motor diodes into the ESC and include a special circuit to deliver more power and run time. We also use processor-native machine code software for best operation.

Adnan: One-Touch Setup, Polar Drive, and Radio Priority Circuitry. We introduced One-Touch Setup several years ago in 1993. This made it extremely easy for both the beginner and the advanced user to set up their speed control accurately. Polar Drive Circuitry allows us to design ESCs with very high-speed switching that won't also cause radio interference or voltage spikes in the system. We can offer racers a very efficient speed control without high-frequency switching

losses. Radio Priority Circuitry was also introduced in 1993. This particular circuitry allows the electronics in the car to operate properly, even when the battery voltage drops below normal operating limits. Bringing together these technologies along with user programmability is what has made the Cyclone possible.

Jürgen: The digital microchip has made a big difference in the ESC technology we have today versus what the industry had in the past. We can now include many features via the digital chip that would be incredibly difficult to duplicate with resistors and diodes and so on, and we can put those features into a smaller package. Another big plus for LRP isn't technology at all, but the benefit of experience; Team Associated has been invaluable to us and our efforts to deliver the finest speed controls. When you can have someone like Mark Pavidis tell you how to improve the feel of your ESC, it is a tremendous advantage.

Mike: One-Touch Setup, intelligent traction control systems and infinite current control. We were really late introducing One-Touch Setup for lots of reasons, the main one being we could not implement our current control system digitally at the time.

The intelligent traction system looks at what the motor is really doing and modifies, slightly and very quickly, the ESC's response. This led to a significant run-time improvement for us. The infinite current control "ramps up" motor current in a controlled way, virtually eliminating motor "saturation," which further increases efficiency by allowing the motor to run cooler and also reduces brush and comm wear.

What does the future hold for ESC technology?

Mike: Well, FETs are continuing to reduce in resistance so you might see fewer being used, or maybe the size of the FETs will be reduced. Small FETs are available—they are nearly right for ESCs now—and you could see really tiny ESCs soon! Improvements in technology that allow less-talented or less-experienced drivers more power and run time will also be important. In the end, you only have so much power in a pack of cells; it's how you use it that counts!

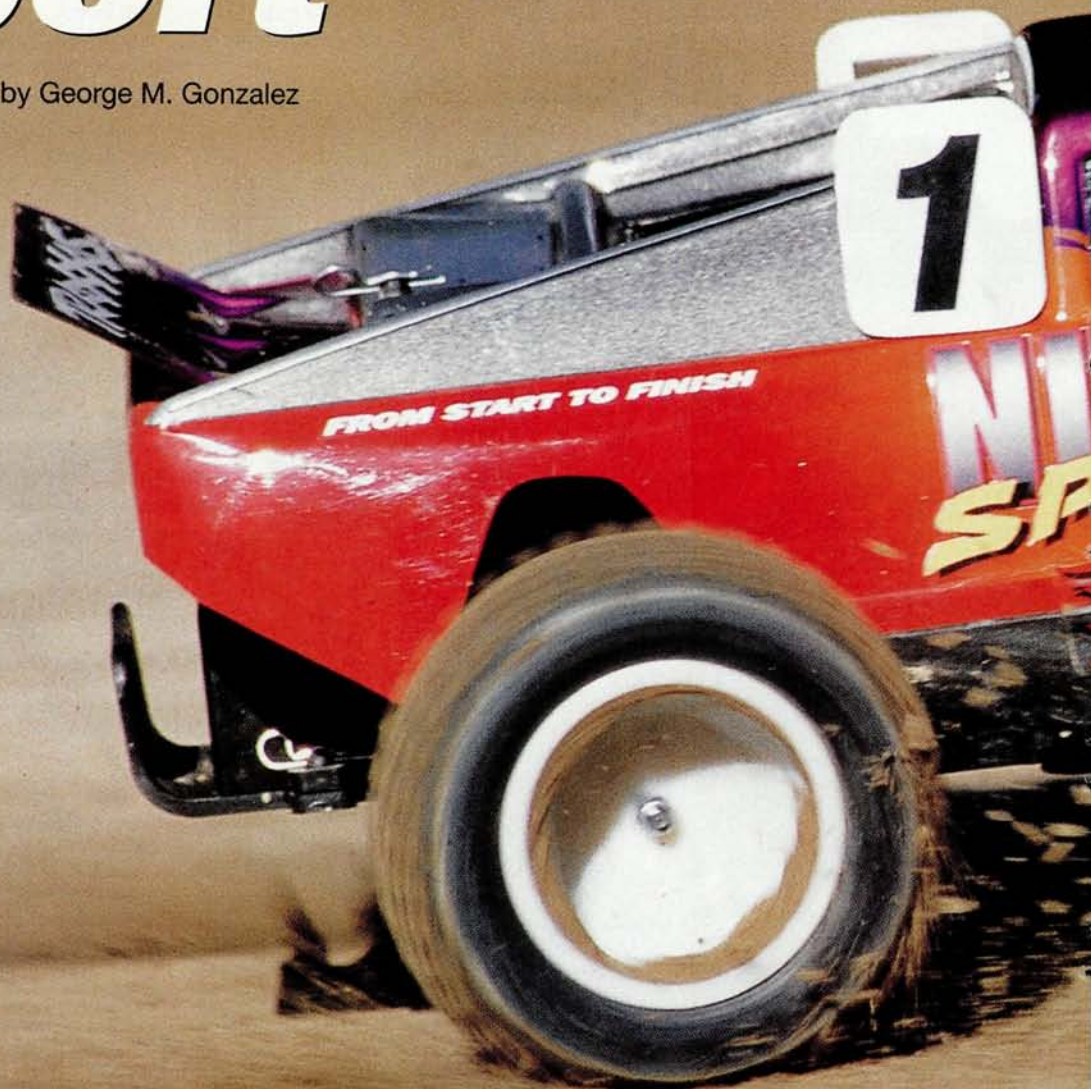
Adnan: Hard to say! Getting more features into a smaller package will be very important, as well as maximizing efficiency, which is always a top goal.

Jürgen: More features for the average driver. When you watch racers like Associated's team drivers, you realize that a lot of their skill comes from their throttle control; it's all in the finger. We want to give the average guy that kind of control through technology—after all, we can't sell you Mark Pavidis' finger!

Kevin: Newer, better, faster, smaller, etc.! The G-10 is the future for Tekin; it's smaller and lighter and has a low center of gravity. But the multi-tune parameters are what really make it special; it's easy to use, gives you many more adjustment options, and you can tune it right in the car. This makes it much more versatile than a fixed-setup speed control. ■

FIRST LOOK
***Traxxas
Nitro
Sport***

by George M. Gonzalez



Redefining the term **entry**



Traxxas* has built a reputation on their high-quality, sport-level R/C products; in fact, no company has made it easier to get started in off-road gas racing. Take, for instance, the company's new Nitro Sport glow-powered stadium truck; at a glance, it appears very similar to

the Traxxas Nitro Rustler, but if you look closely, you'll notice innovative features that make this truck even easier to run and maintain. The truth is that the Nitro Sport is basically a slightly de-tuned Nitro Rustler and shares many of its racing features.

level

PHOTOS BY WALTER SIDAS

Here's a quick look at this hot truck's new features.



REAR END

Out back, you'll find another set of extra-long suspension arms, adjustable camber rods and large-capacity shocks. Check out the sealed battery box that protects the receiver batteries from the elements. Yes, the universal sliders are also standard issue. The four-prong connector is part of the truck's electric starter (more on this feature to come).

Here's the big picture: as you can see, the Nitro Sport is a very serious stadium truck. The overall chassis layout is very well planned and easy to work on. Check out the molded receiver box—an ounce of prevention ... Hey, what's that little electric motor that's mounted next to the engine?



POWER CONTROL UNIT

Just plug in the power unit, push the button and away you go. The power unit uses a standard 7.2V battery pack that will provide more than 100 starts on a single charge.

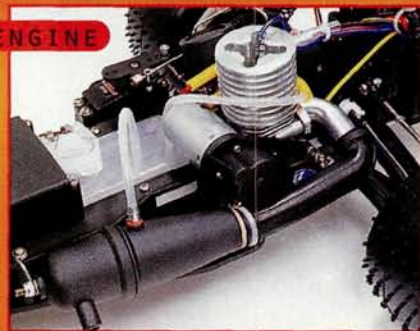
Traxxas doesn't hold back when it comes to "packing the ponies." If you want your first gas truck to be sick fast, the Nitro Sport will not disappoint you. The Sport comes equipped with a .15ci engine with tuned pipe and large heat-sink head. Traxxas even supplies a special "sport-tuned" carburetor that omits the bottom-end adjustment screw; one less thing to worry about.

Remember that "little electric motor that's mounted next to the



DRIVE TRAIN

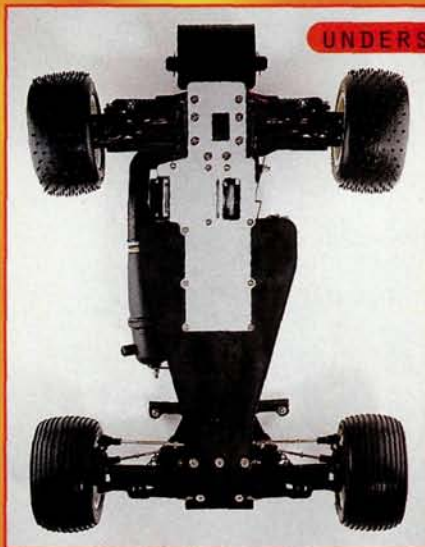
The clutch bell simply mates with the spur gear. Adjustable engine mounts allow clutch-bell and spur-gear changes to alter the truck's final gear ratio. No slipper clutch is provided, but one is available as a low-buck option.



ENGINE

engine"? Well, as you can see, the pull-start mechanism has been replaced with a user-friendly electric starter. The wire that goes into the cylinder head is connected to the glow plug. By pressing a single button on the power control, the proper voltage is fed to the glow plug, and the small onboard electric motor cranks up the engine.

UNDERSIDE



The flip side reveals the two-piece chassis. The front portion is molded, which keeps the overall cost down, but the rear portion is made from T6 aluminum for increased strength and improved engine-heat dissipation.



FRONT END

The front end of the Nitro Sport is all Nitro Rustler. Extra-long suspension arms and big-bore shocks tame the roughest track conditions, while tie rods are provided for the upper links and steering arms to allow camber and toe-in/out adjustments.

The Car Action editors got a chance to run the new Traxxas Nitro Sport on a tight clay off-road track, and the smiles on our faces will serve as a testimony to the truck's incredible performance and its ease of operation. We plan to follow up with a complete "Thrash Test" in a future issue, so stay tuned!

*Addresses are listed alphabetically in the Index of Manufacturers on page 193. ■

HOME PROJECT
BUILT

MONGOOSE MONSTER TRUCK

by Kevin Hetmanski



From Shopping to Stomping

This is a story of how a rolling mass of tarnished chrome rods was liberated from a pitiful life doomed to Pampers and peanut butter shopping—to be freed to bask in the shining glory of Monster Truck stomping.

It's a simple story of one blow torch, one grocery cart and one heck of a talented craftsman who

answered the call. A man who understood the dread and drudgery of having to spend a life in the company of the Coupon Lady.

The metallurgic emancipator is Hector Aponte from the Bronx, NY (did you know the Trojan god of war was also called Hector?—a hero's name to be

Caged Animal



sure!). Hector, who has been building and setting up trucks for nine years, put his torch and creativity (oh, yes, and some aftermarket parts from the most popular monster truck ever, the Tamiya Clod Buster)

to a pile of unrelated metal to create what might well be the most beautiful monster ever—the awesome Mongoose.

Here's how he did it.

HOME PROJECT BUILT



Kind of reminds you of the Terminator without his skin, doesn't it? The Mongoose's "endoskeleton" an amazing piece of craftsmanship. This is one incredible monster!

Builder/creator/
master chassis
designer Hector
Aponte.



The Mongoose has to be the most realistic monster truck yet, and the best part is that it's tougher than nails. Hector has raced it many times and has never broken a single part.



Above: a view of the custom-made cantilever suspension. MRC World Scale shocks are used out back.



Above: wow! This is what we call "highly detailed." Hector spent a lot of time in this area. No doubt, this truck is a crowd pleaser. Left: a Tekin Titan reversing ESC easily handles the dual Trinity Sapphire motors and extra-low gearing. The Novak fan just ahead of the ESC prevents a nuclear meltdown.



Notice the custom steering-servo placement up front? That's a Hitec 605BB high-speed/high-torque servo controlling this beast. Vertically mounted Trinity aluminum shocks smooth out the bumps. Many ESP suspension pieces are used, but they have been modified greatly.



Here are the hind quarters. Hector chose to do without the 4-wheel steering, so the steering servo was omitted.

By using a CAD system to design the prototype chassis, Hector was able to pinpoint potential problem areas before he actually began to build the Mongoose. Once the chassis was fully designed and potential problems had been ironed out, Hector began construction.

The main part of the chassis is made of steel rod. A discarded grocery cart provided all the steel Hector needed to complete the project. He cut the rods to the right lengths, bent them into shape and then soldered them together. He also constructed a fully functional and realistic-looking roll cage with the same shopping-cart steel. The resulting chassis is light and strong. Hector painted the completed chassis bright yellow to improve its scale appearance.

The Mongoose has a very realistic-looking interior. I don't think a single detail was left out. Check out the seat made from a cut-down elbow pad; a set of switches (from an electronic store); the detailed dashboard with a full set of gauges; shifters constructed from threaded airplane rod with small arts-and-crafts-store beads glued to the top; and the steering wheel heisted from a toy truck. A "kill" box, a fire extinguisher and a suited-up, ready-to-go driver figure were also included. All those details make me want to jump in and take this baby for a ride!

This truck wouldn't look very realistic without a 4-link suspension. For ideal fit and performance, Hector designed a custom 4-link setup. He used ESP* suspension links to attach the Clod Buster gearboxes to the chassis. The bars on the Mongoose are set up as they would be on a full-size monster truck. The top bars attach the center of the gearbox to a custom bracket. The steering servo is mounted on a piece of angled aluminum that is mounted on the front gearbox. On the stock Clod, a second steering servo is mounted on the rear gearbox to provide 4-wheel steering; Hector, however, chose to lock up the rear steering linkage and do without the rear-wheel steering.

Two vertically mounted Trinity shocks provide the front damping. Hector attached empty shock bodies to the truck's main shocks to simulate the nitro shocks used on full-scale monster trucks. The rear damping uses a cantilevered system with MRC* World Scale shocks, which were custom designed and crafted for the Mongoose. Adjustable links attach the cantilevered shocks to the gearbox; this makes it easier to adjust the rear ride height. The truck uses a swaybar to keep the rear tires firmly planted on the ground. A front swaybar is easily added, if necessary.

The battery is mounted underneath the chassis to help keep the truck's center of gravity low. Hector modified Kyosho* Nitro USA-1 tires and wheels and mounted them to fit the Tamiya axles while retaining the stock Clod gearboxes. The Kyosho tires and wheels are a little lighter than the Clod units, and they look ultra-cool, too!

The guiding force for this truck is a Futaba* PCM radio. A Deans* antenna catches the radio waves and is not easily visible, so the truck looks even more realistic. A Tekin* Titan speed control supplies the power to the twin Trinity Sapphire motors. Calandra Racing Concepts* adjustable motor mounts attach the motors to the gearbox and give the truck a greater variety of gear ratios, and a fan keeps the speed control running nice and cool.

A Parma* Big Foot body tops off this awesome truck. This is the first body Hector has ever painted and detailed (not bad for a first effort!). Rather than paint the headlights on the body, Hector masked off the lenses and left them clear. He then found a picture of a real Ford truck in an automotive magazine and simply cut out the headlights and glued them to the inside of the body. Hector also removed the truck's front grill and replaced it with a molded grill that he cut out of plastic mesh and glued to the inside of the body. Hector even removed the truck's bed—just like on real monster trucks. Now his skills can easily be seen, even when the body is installed on the truck.

What else is there to say? This truck is fantastic! The Mongoose has to be the most realistic monster truck yet, and the best part is that it's tougher than nails. Hector has raced it many times and has never broken a single part—even during many flip-overs and several run-ins with curbs. Hector is working on several other projects, and we can't wait to see them, but this homebuilt monster truck will be a tough one to beat.

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.



SANYO Single Cells (w/o tabs)

Model #	1.2V/MAH	DxH(mm)	WT(g)	Sale
N-50AAA	50	10.0 x 15.0	3.5	\$2.00
N-110AA	110	14.0 x 16.5	8	2.00
N-600AA	600	14.0 x 49.5	24	1.60
KR-800AAE	800	14.0 x 50.0	28	2.50
KR-1100AAU	1100	14.0 x 50.0	27	3.00
N-225AE	225	16.5 x 16.3	12	3.00
KR-600AE	600	16.5 x 27.8	22	2.25
N-1000SCR	1000	22.0 x 33.0	39	4.20
KR-1300SC	1300	22.0 x 42.0	48	2.80
N-1400SCR	1400	22.0 x 42.0	52	4.20
RC-1700	1700	22.0 x 42.0	54	5.50
N-1700SCRC	1700	22.0 x 42.0	55	5.50
RC-2000	2000	22.0 x 42.0	58	7.50
KR-4400D	4400	32.3 x 61.0	150	9.50

Sanyo / GE alkalines are now available through CERMARK
Please add \$0.20 per single cell with Solder Tabs

SANYO Power Packs (Flat or Hump)

Model#	V/MAH	LxWxT(mm)	Sale
8N-600AA-4(TYCO)	9.6V/600	102 x 56 x 14	18.00
6N-1000SCR	7.2V/600	106 x 46 x 23	28.00
7N-1000SCR	8.4V/1000	125 x 46 x 23	32.00
6N-1500SC(Sports Pack)	7.2V/1500	135 x 46 x 23	15.00
6N-1400SCR	7.2V/1400	135 x 46 x 23	28.00
7N-1400SCR	8.4V/1400	150 x 46 x 23	32.00
6RC-1700	7.2V/1700	135 x 46 x 23	39.00
7RC-1700	8.4V/1700	150 x 46 x 23	44.50
6N-1700SCRC	7.2V/1700	135 x 46 x 23	39.00
7N-1700SCRC	8.4V/1700	150 x 46 x 23	44.50
6RC-2000	7.2V/2000	135 x 46 x 23	49.00
7RC-2000	8.4V/2000	150 x 46 x 23	56.50

Tamiya Conn. comes standard with all Power Packs

SANYO Packs For Radio (Flat or Sq.)

Model#	V/MAH	LxWxT(mm)	Sale
4N-600AA	4.8V/600	56 x 50 x 14	9.00
4N-225AE	4.8V/225	67 x 17 x 17	12.00
4KR-600AE	4.8V/600	67 x 28 x 17	12.00
5N-50AAA	6.0V/50	50 x 15 x 10	10.00
5N-600AA	6.0V/600	70 x 50 x 14	9.00
5N-225AE	6.0V/225	83 x 17 x 17	12.00
5KR-600AE	6.0V/600	83 x 28 x 17	12.00
8N-600AA-1	9.6V/600	100 x 29 x 29 (w/wire)	18.00
8N-600AA-3	10.2V/600	116 x 50 x 14 (w/wire)	18.00
8N-600AA-4	10.2V/600	100 x 56 x 14 (w/wire)	18.00

* Add \$4.00 to Connect Specific Radio Connector

* Call us if you can not find your Sanyopack on this list.

hitec (Servos & Radio systems)

MODEL #	DESCRIPTION	SALE
HS-85BB	Mighty Micro Servo wtop BB (38oz)	32.95
HS-205-BB	Super Mini Low Profile Servo (42oz)	27.55
HS-300	Slurper Sport Servo (42oz)	10.95
HS-425BB	Pro Servo with Dual Ball Bearing(43oz)	18.95
HS-605BB	Ultra Torque Servo (77oz)	36.95
HS-605MG	Ultra Torq. Servo (all metal gear)	46.55
HS-615MG	Super Torq. (metal gear - 107oz)	46.55
HS-700BB	Giant Scale Servo (133oz)	29.55
Shredder Rx	Micro Shredder Receiver (all brands - 75mHz)	31.95
RXT0475	75mHz AM single conv. Tx & Rx set	8.50
HRS0475AM	Lynx AM (75mHz) Radio System	59.95

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* Please specify the desired connector on your Hitec unit.

Gold Plate Connectors

Male servo lead 12"	2.50	
Male battery lead 12"	2.50	
Female 3 wire 12"	2.75	
Female 2 wire 12"	2.75	
Extension 6"	4.00	
12"	4.50	
Switch w/harder wired	8.00	
Exchange adaptors (servo-rx)	4.00	
JST (BEC) male / female set	4.00	
Dean Ultra Plug (set)	3.00	
Anderson Conn. (Sermos) (Set)	3.25	
Dean Ultra Plug (set)	3.00	
Tamiya set w/o wire	3.25	
Gold plated copper bars x 6	3.00	

* Available for Futaba G/J, Airtronics, J/R, Hi-Tech, World-Eng.

* Prices Effective 8-1-97 and subject to change without notice

* Visa & Master card accepted (S & H is \$5.99)

* S & H is \$5.99 and UPS Cod Cash is \$5.99 for any size order

* All returns subject to inspection and 15% restocking fee

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Project Tamiya TA03

PART 1 FULL OPTION KOSE

by George M. Gonzalez

THE TAMIYA* TA03 touring-car chassis takes the cake for hop-up potential. I don't think there has ever been a car with more possibilities. Companies such as Cross Racing*, Kawada*, Kose*, Tech Racing* and GPM Racing* (to name just a few) offer many hop-ups that are designed to increase the tuneability and performance of this venerable chassis. We decided to test a few of these fully optioned, "specialty tuned" TA03F-Pros to see how they would perform in real racing conditions as well as in normal, day-to-day pavement thrashing.

The folks at Japan R/C Imports* sent us the Kose hop-up parts they offer, so we were able to build our own full-option Kose TA03. We plan to publish other articles on Tamiya TA03 projects soon, so stay tuned. In the meantime, we'll focus on the Kose/Tamiya TA03R-Pro shown on these pages.

HOP UP, BEFORE YOU HOP UP

Before our project car was "Kose-ized," we gave it a special Tamiya factory treatment during which we installed many of Tamiya's optional drive train and suspension parts. Our TA03 was also converted to a more conventional mid-motor configuration, hence, the TA03R-Pro designation.

The Tamiya options took our project car to a new level of performance: the mid-motor conversion alone changed the handling of the car dramatically, and the moment the car hit the track, we could feel the benefits of every single hop-up, especially Tamiya's new A-compound tires, which are reinforced with a fiberglass cloth belt.

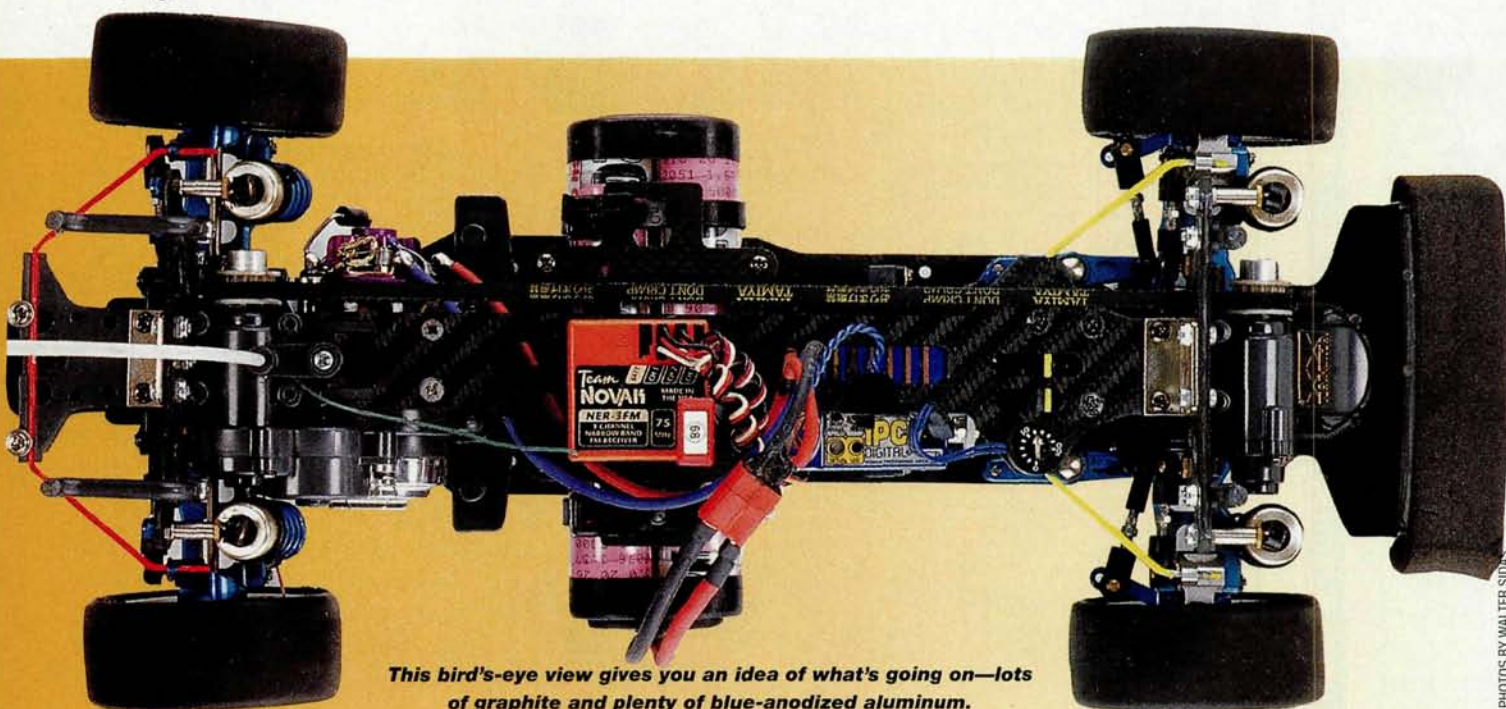
BRING ON THE GRAPHITE

We installed upper and lower carbon chassis plates (K-1262—lower, K-1263—upper) first. Kose chassis plates are made of 100-percent woven carbon fiber and are lighter than stock FRP chassis plates. The Kose chassis is also much more rigid than the stock chassis, and this makes a solid foundation. Oh, and let's not forget esthetics: it looks very cool!

In keeping with the car's new high-tech looks, we replaced the stock plastic shock towers with Kose front and rear carbon shock mounts (K-1272—front, K-1273—rear). These units are much thinner than the bulky stock pieces and that means they're also much lighter. The shock towers include aluminum standoffs for mounting the ball joints that secure the top of the shocks to the shock tower. The standoffs ensure that the TA03's original suspension geometry remains unaffected.



Here's a close-up of our project car's bulletproof aluminum front suspension.



This bird's-eye view gives you an idea of what's going on—lots of graphite and plenty of blue-anodized aluminum.

PARTS USED

TAMIYA

- Low-friction aluminum dampers (2 pairs) —part no. 53280.
- Heat-sink motor mount —53275.
- Hard-joint drive-cup set—53217.
- 3mm tungsten-carbide diff-ball set (2)—53217.
- Aluminum pressure plates (2 sets)—53219.
- Aramid drive belt—53278.
- Universal drive shafts (2 pairs)—53172.
- Aluminum counter-gear shafts (2 sets)—53274.
- TA03 swaybar set—53276.
- A-compound slick tires—53293.
- Graphite battery mount—53261.
- Adjustable upper links—53192.
- Adjustable steering links—53191.
- High-torque servo-saver—50473.
- TA03R urethane front bumper—53304.
- TA03R front gearbox—50743.
- 1150 ball bearings (2).
- Belt guide bushing—3455381.
- One 3x15 self-tapping screw.

ALUMINUM PIECES

KOSE

- Super suspension arms (2 pairs)—K-1266
- Front super steering blocks—K-19528
- Rear super hub carriers—K-1269
- Super steering system—K-1264
- Front steering gearbox support posts—K-1270
- 3mm plastic shim set—K-1604

CROSS-RACING

- 2-degree aluminum front uprights—TT-40.

Kose also manufactures aluminum front uprights but does not include provisions for installing a front swaybar.



We equipped our Project TA03 with a Cross Toyota Supra body in Cerumo/Castrol team colors.

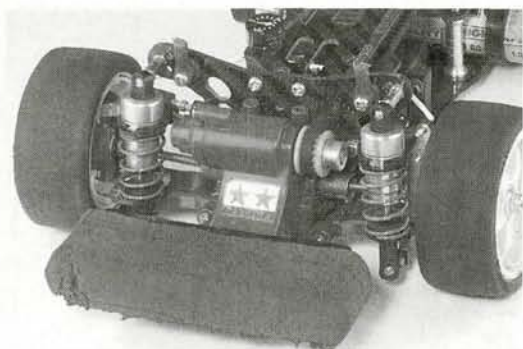
BRING ON THE BLUE-ANODIZED ALUMINUM

Kose offers many blue-anodized aluminum suspension pieces that look really trick when mounted on a TA03. I've installed super-rigid aluminum suspension parts on several cars in the past and, in some cases, the aluminum made these cars feel twitchy or unstable.

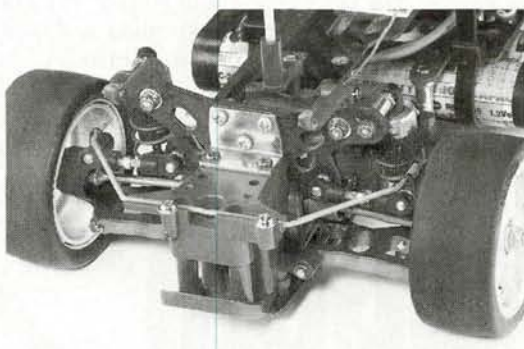
However, after talking to a few TA03 drivers who have been using aluminum suspensions

successfully, we decided to give the pretty blue suspension parts a try. After installation, the car was just as easy to drive as before—but now it's almost indestructible!

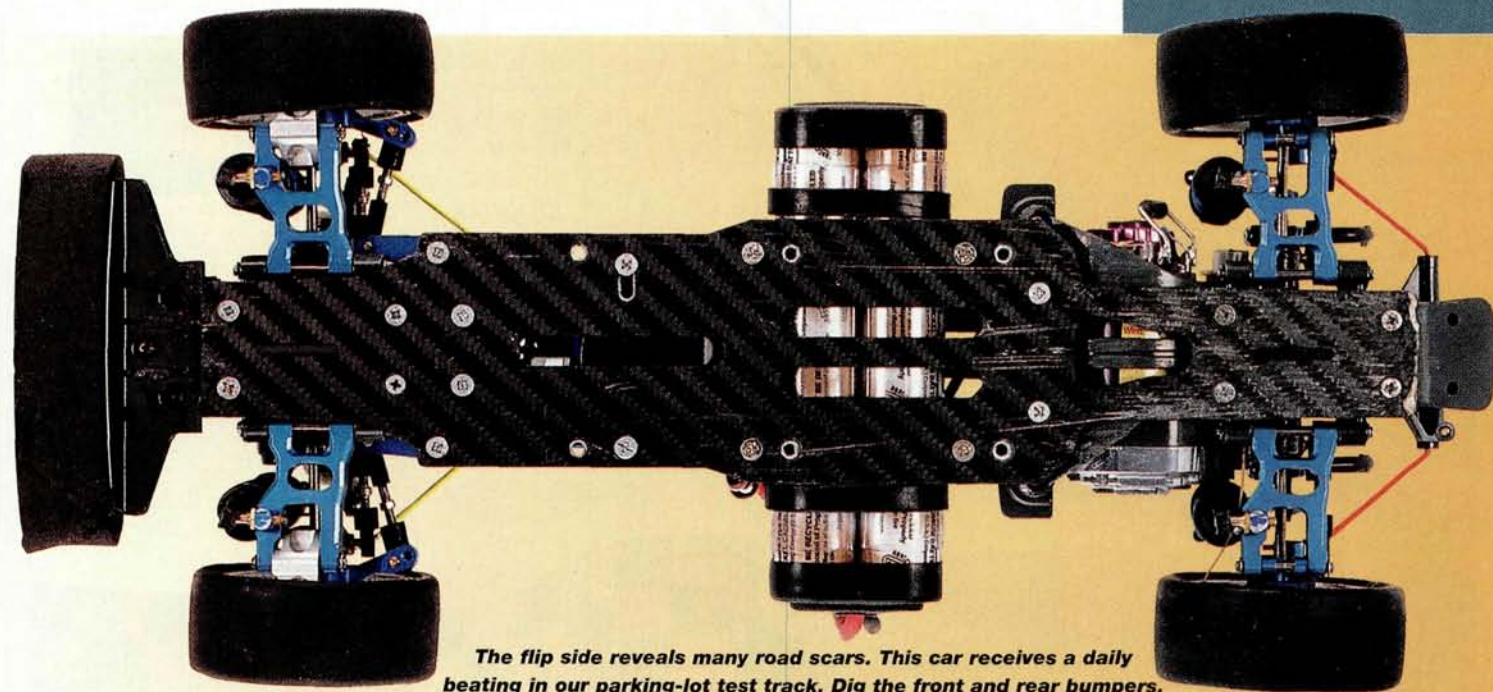
The Kose aluminum pieces are nicely machined and include all the required hinge pins and E-clips for easy installation. Kose highly recommends, however, that you also buy their plastic suspension spacers before converting your car to aluminum. The spacer



Tamiya's TA03R front gearbox, urethane front bumper, low-friction aluminum dampers, universal drive shafts and A-compound tires are found here. Check out the Kose graphite shock tower.



Many of the hop-ups used up front are seen back here, too. A sharp-looking Kose graphite shock tower is also part of the picture.



The flip side reveals many road scars. This car receives a daily beating in our parking-lot test track. Dig the front and rear bumpers.

set allows you to assemble the suspension parts with near-zero play and no binding—an inexpensive way to improve the performance of any suspension system.

Kose front steering blocks/axle carriers include an extra (inner) hole on the steering arm that, when used, will provide more aggressive steering. The Super Steering system is well worth the price. For smooth steering action, each bell-crank pivots on metal bushings, and the unit provides virtually slop-free performance. The aluminum suspension arms may appear to be heavier than the stock plastic suspension arms, but they're actually lighter. The aluminum suspension arms are also more rigid and stronger than the stock units, which means more consistent handling on smooth tracks and fewer visits to the hobby shop to replace broken pieces. The aluminum suspension arms also work with the TA03's vertically mounted shocks and will not change the stock suspension geometry.

We chose to install Cross Racing's 2-degree aluminum front uprights because they include swaybar mounts and provide 5 degrees of combined front caster—3 degrees less than the stock 8 degrees.

Slightly improved turn-in steering is the result of running less front caster.

PERFORMANCE

Our project TA03 has well over 100 races on it. In fact, this is one of the cars that we use during our lunch-hour thrash sessions. A few times a week, editor Peter Vieira and I set up corner markers on our usual test site, charge up the batteries and then go and rub fenders. After running 4 or 5 batteries, the car is tossed into the back seat of one of our cars—until the next thrashing. Our project car has never let us down, and everyone who has driven it agrees that it is incredibly easy to drive and is a real confidence builder.

When you race as frequently as we do, maintenance becomes an issue. I've rebuilt the front and rear diffs twice, gone through at least a dozen sets of tires, rebuilt the shocks at least 20 times and replaced one 5x11 ball bearing (counter-shaft bearing) that disintegrated inside the front gearbox. I also went through four bodies, two spur gears and several motors. The LRP* V6 ESC and Futaba* 131SH steering servo have never failed and continue to provide topnotch performance.

I prefer the way the car handles in the mid-motor configuration; but I also believe that newcomers to the hobby will find the car easier to drive when the motor is mounted on the front. That's one of the beautiful things about the 03; with a few spare parts, you can set up the car in either configuration.

FINAL THOUGHTS

We hope you like reading about our Kose/Tamiya TA03R-Pro as much as we like racing it. The Kose parts used need special care during installation, but the results are well worth the effort. Our project car has hundreds of runs on it, and it's still race ready; this proves that Kose parts and, of course, the TA03, are high-quality products. You can look forward to Part 2 of the Project Tamiya TA03 series in a future issue. In the meantime, we'll run another 100 packs or so through our project car; I'm starting to doubt that it will ever die!

**Addresses are listed alphabetically in the Index of Manufacturers on page 193.*

Hex Appeal



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Troubleshoot Your Ball Diff

10 tips for a dynamite diff

by Doug Mertes



Pan cars and F1 chassis all have exposed diffs (top) that will require frequent cleanings to operate smoothly. The ball diffs on off-road vehicles and several touring-car chassis (bottom) require less frequent cleanings because they're installed inside sealed gearboxes.

ON-ROAD AND OFF-ROAD DIFF-ERENCES

1 Pan cars and F1 chassis have ball diffs that are out in the open. They're exposed to grit, dirt, dust and carpet fibers, all of which can make them notchy and tight. An exposed diff requires more frequent cleaning, but it's easy to do once you know the basic steps. The first few times, have your car's assembly manual (or a photocopy of the relevant page) close at hand for reference. Remove the diff side wheel and hub and lay all of the parts out on a clean, cotton shop towel. Clean them with a mild solvent such as denatured alcohol, or spray the grease and dirt off with motor spray (always protect your skin and use these chemicals in a well-ventilated area). I use hot water, hand soap and an old toothbrush to clean the spur gear. Put a dab of diff lube on your index finger and use it to pick up the clean diff balls. Coat the balls by rubbing them in the palm of your other hand, and place the balls in the spur gear. Check the diff rings before you reassemble the diff. If a polished line is visible on the diff rings, that's OK. If there is a groove made by the diff balls, that means trouble. Don't buy new rings just yet, though. Flip over the set you have to reveal the unworn side and reassemble the diff following the diagram in the manual. Tighten the nut half a turn at a time and spin it occasionally to avoid flat-spotting the balls. This should give you nice, smooth results, unless you need to replace some parts. If you've already had to flip the diff rings, new diff balls and diff rings may be in order.

2 Off-road and touring car diffs are usually hidden deep within the recesses of the gearbox, so they're protected from the elements and stay smooth for a longer time. Unfortunately, this also means that they tend to get very little attention from the tuner. Combine this with the fact that off-road diffs have to contend with shocks, bumps, ruts and harsh landings, and you have the potential for disaster! Like their on-road brethren, when their action is stiff, gritty or inconsistent you'll know it's time for a rebuild. To rebuild an off-road or touring car diff, follow the same procedure, although remember that the parts are often smaller and the assembly is less straightforward than with on-road diffs. Take your time, use the manual, and be very careful when setting the tension. The general procedure is to insert a screwdriver into each of the outdrives (with the diff out of the car) and then attempt to rotate the diff gear. If the gear slips, the diff is too loose.

SO, YOU HAVE a ball differential installed in your car. You're not exactly sure how it works, even though you managed to assemble it according to the directions in the manual. Lately it has been sounding well, different, and a guy at the track spun the wheels and said it needs attention. What do you do?

Often, a good old-fashioned rebuild will recover the smooth diff action your car once knew, but sometimes, a few extra tweaks are required to get a ball diff up to top performance. Here's how to get the most out of the diffs in your pan car, buggy, truck or 4WD machine.



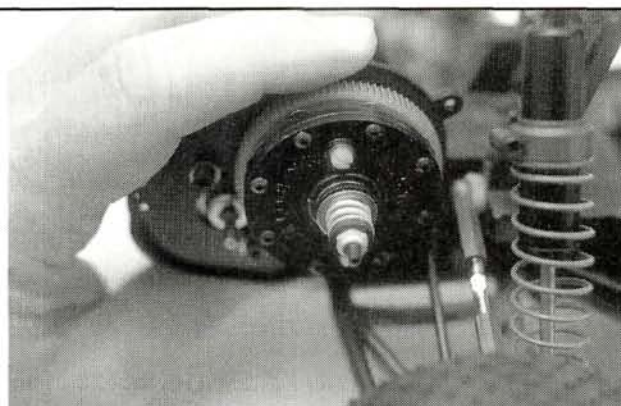
There are many diff lubes on the market. Your best bet is to stick to the manufacturer's recommendations when it's time to rebuild. There's nothing wrong with experimenting, though; many top racers have personal preferences, and you may have some, too.

3 DIFF LUBES

I'm convinced that there are as many opinions about diff lube as there are racers. Some like it thin while others prefer the paste-type lubes. I prefer the thick, pasty stuff myself. I also like the Associated* and Trinity* silicone products. Other folks prefer the thinner fluid-type lubes, some of which contain Teflon additives. In any case, use just enough to coat the balls. Too much grease slows the diff action and attracts gunk. Stay away from thin greases that are not designed for diff lubrication; although they allow the diff to operate, they are quickly flung from the diff balls by centrifugal force; this makes a mess and leaves your diff short of lubrication.

SLIPPING AND ADJUSTMENT

- 4** On carpet tracks, the diff can be set tight to get a really hard launch off the line, and pop from corner to corner as the car accelerates out of the turns. Parking lots are a different matter, as a slightly loose diff that slips for a foot or two can prevent you from spinning out at the starting line or in tight turns. If the diff is so loose that it feels as though the car lags behind your throttle input, it's too loose. Buggy and truck drivers with a slipper clutch or Hydra-Drive should set the diff so tight that it just won't slip. The slipper device lets the motor spool up to speed and reduces traction loss caused by wheelspin. Read the back pages of your manual—where the tuning tips usually are—to find out how to properly adjust the slipper.



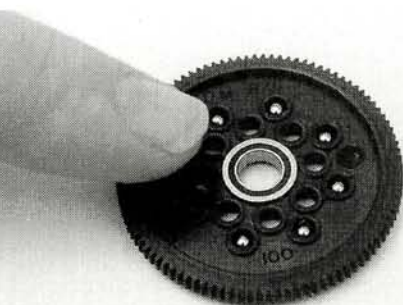
Most off-road vehicles rely on slipper clutches or other traction-control devices to prevent wheelspin. In these cases, it's best to set the diff as tight as possible (no slipping). The diffs in these kinds of vehicles are usually sealed, so they will last a long time between rebuilds.

5 BEARING-SUPPORTED SPURS

Are you having a problem with inconsistent diff action? If your settings don't seem to last very long, check out the bearing that's in the center of the spur gear on most high-quality ball diffs. Although these bearings typically last as long as the vehicle, their life can be shortened by impact, dirt, dust and carpet fibers. A bad bearing here will allow the spur to wobble on the center shaft; this accelerates gear wear and causes weird diff ring groove patterns that are oval instead of circular.

6 LENGTH OF SERVICE FOR COMPONENTS

How long should all this stuff last? Although it depends on the environment in which you run your car or truck, the following general guidelines should help you set up a comprehensive diff-maintenance schedule. Exposed diffs should have a complete teardown every six to 10 runs. Expect to replace the diff balls every three rebuilds, and replace or recondition the rings at the same time. Hub bearings and thrust bearings require replacement once a season or so. Sedan and off-road diffs often last an entire season without needing any attention whatsoever. However, some off-road racers run their diffs very loose or super-tight, and must rebuild them more frequently.

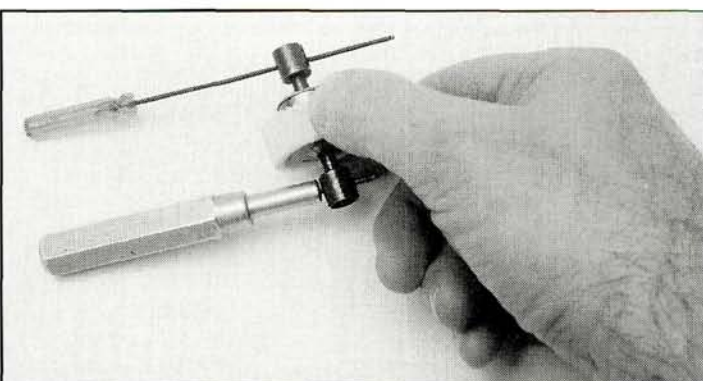


Bearing-supported spur gears are designed to provide the smoothest possible diff action. If the bearing becomes damaged by an impact or becomes worn with use, diff action will suffer. Always check the condition of this crucial bearing.

THRUST WASHERS

- 7** Along with the diff balls that are in the spur gear, these little rascal thrust washers are critical to a smooth diff.

Because they're small in diameter and fit in constricted spaces, their ball races are usually small and wear quickly. Pan cars typically use the inner race of the outer hub bearing as the thrust component, but since those bearings weren't designed to accept radial loads, service life can be very short. I suggest that you use a very thick lube such as Associated's black grease on these components, since they rarely have to spin very rapidly. Some sedan and off-road thrust bearings are assembled with individual balls and washers. It's a pain to keep track of all those teeny parts, but this design allows you to really pay attention to the amount of lubricant used.



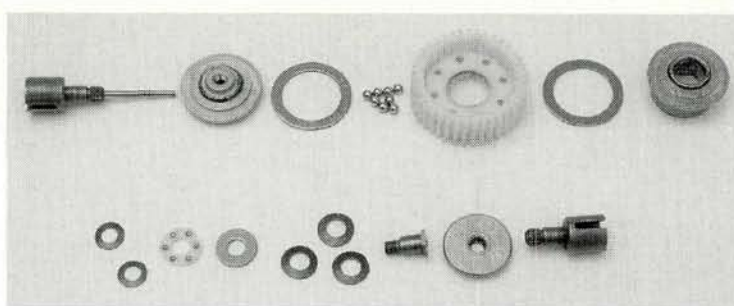
The best way to adjust the diff when it has been removed from the vehicle is with two flat-blade screwdrivers or any tool that has a thin blade. Insert the screwdriver blade into each out-drive and then try to rotate the diff gear. If the diff is adjusted correctly, it should be almost impossible to rotate.

8 DIFF BALLS

A decade ago, serious racers paid high prices for super-round, super-tough diff balls. These days, you can buy very round, relatively hard balls at low prices, and they last a long time. For a really good deal on diff balls, look in the Yellow Pages for bearing suppliers. High-grade, relatively inexpensive ball bearings in the correct diameter can be purchased in quantities of 100 or more. Sure, it will take you years to go through 100 diff balls, but you'll always have a supply when it's time for a rebuild!

9 DIFF RINGS

Most pan cars use a diff-ring of a standard size that can be used with any brand of car. Some diff designs, such as those by as Corally* and IRS*, also use a thin rubber O-ring that fits in a groove machined in the diff hub and axle face. This O-ring provides a cushion to protect the balls from impact, and it also prevents the diff-ring from rotating on the hub under power. Don't superglue the diff-rings to the hubs. Instead, install a small nylon or metal pin into the hubs to mate with notches cut in the ring's inner circumference. This procedure will lock the diff-ring into place without adhesives. IRS, Racetech*, BRP* and many other companies offer notched diff-rings and diff-pinning kits that are easy to install.



As you can see in this photo of a Tamiya ball diff, many small parts are used. When it's time to rebuild, always have your original instructions handy. It's too easy to install a washer backwards, and that will prevent the ball diff from functioning properly.

10 4WD DIFF TUNING

Four-wheel-drive cars have a diff at each end, and it's important to balance their adjustment to maximize drive-train efficiency. On a slippery surface, it's often better to have the rear diff slightly looser than the front. The front end pulls the car through the turns, while the rear wheels slip a little, thus reducing the car's propensity to spin out. On a track with lots of traction, a tight rear diff and a loose front diff will increase steering (especially during braking). Different drivers will like different setups, but knowing how each end affects the car gives the astute tuner additional weaponry for the parking lot and off-road wars!

**Addresses are listed alphabetically in the Index of Manufacturers on page 193. ■*



Many 4WD touring-car chassis have a ball diff at each end. You can actually tune front and rear traction by adjusting the front and rear ball diffs.



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(Porsche 993-GT2 shown)



Porsche 993-GT2 shown with radio and optional accessories.
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Left: Chris and Chris clutch their tickets to Japan. It's a long plane ride, boys; don't eat those peanuts all at once. Above: third-place finishers George Johnson and Michael Evert enjoy some quiet time between heats. Right: some racers, for example, Frank Shapabur and Pete Kasiwat, traveled all the way from Chicago to compete.



Above: Richard McCloskey and Albert Langarica relax in the pits.



Next Stop... Japan

THE KYOSHO WORLD Cup '97 racing program is a good example of spec-type racing on an international scale. In this competition series, two-person teams drive a Kyosho GP-10 car. In four regions of the U.S., Kyosho sponsored events in which racers from all over the country competed. At each of the regional races, the winning team's prize was an all-expense-paid trip to compete in the Kyosho World Cup Championship in Japan. Such high stakes really raised the tension at the Northern West Coast Regional at Castle Hobbies in San Jose, CA. If you get butterflies in your stomach at a trophy race, imagine how these guys felt!

by Aaron Biner

Kyosho Wo

CHOICES ... CHOICES ...!

nostalgic body? High-tech McLaren GTR replica? Or one of the 10 others? The consensus was that the McLaren GTR, Sard Supra and Opel Calibra bodies were aerodynamically superior, but many teams couldn't resist the '67 Corvettes and Shelby Cobras.

- For tires, Kyoshos Super Grip was the top choice; most drivers chose to go with standard width instead of super narrows because they felt the wider tires gave more predictable handling.

• Racers faced a difficult choice: which body? With over a dozen approved Kyosho bodies to choose from, it was a weighty decision. Vintage-style

WINNERS

POS.	QUAL.	TEAM
1	7	Walrod and Moore
2	2	Itoh and Aakre
3	3	Johnson and Evert
4	6	Wagner and Blackburn
5	9	Funston and Pedro
6	4	Jacobson and Tom
7	10	Lue and Lue
8	5	Hui and Liu
9	8	Yu and Tse
10	1	McCloskey and Langarica



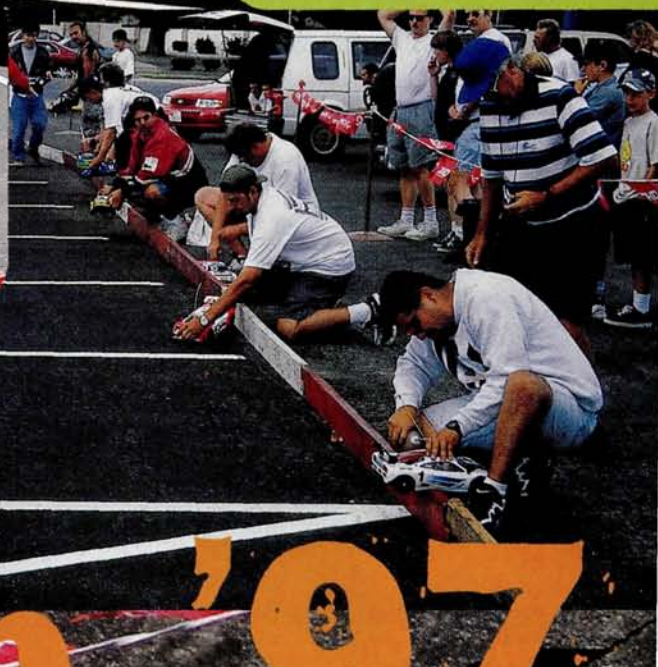
Castle Hobbies racer and employee Eric Vasutin calls the race from the announcer's booth.

KYOSHO WORLD CUP RULES

- Two drivers and one pit person are allowed on a team, but only the drivers are eligible for prizes.
- Cost per team—\$25. All participants are given a bottle of 20-percent Red Alert fuel and two T-shirts.
- The only fuel allowed is 20-percent Red Alert fuel.
- The event is restricted to 4WD gas-powered Kyosho GP-10 cars—one car per team and one backup car in case of a breakdown.
- Almost all hop-ups, including tires and wheels, must be by Kyosho; the only exceptions to this are parts that don't affect the performance of the vehicle and that have to be replaced with some regularity: servo arms, tie straps, servo tape, etc.
- Only genuine Kyosho Pure Ten-style bodies are permitted.
- Teams may use only the stock Kyosho GS-11X engine.
- Kyosho GP-10-sponsored drivers are not allowed to compete.



Left: racer Tom Aakre relaxes while doing his turn-marshall duties. Above: Castle Hobbies owner Terry Scott cleans up after a day of racing. Right: the teams make last-minute preparations for the A-Main.



World Cup '97

PHOTOS BY WARD BAKER

The Rules of the Game ...

During qualifying, an individual car IFMAR format was used at the starting line. This worked well for the teams because a one-by-one staggered start allowed intermediate-level racers to avoid the usual mass-start pileups. Before each qualifier, racers were allowed a 5-minute engine warm-up.

IFMAR FORMAT

Qualifiers

- Ten-minute heats with a change of drivers between the 5- and 7-minute marks.
- The top 10 teams qualify for the A-Main; other teams compete in the lower mains—B, C, D, etc.

Mains

- A-Main—60 minutes.
- B-Main—45 minutes.
- C-Main—30 minutes.
- Other Mains—15 minutes.
- During the A-Main, there must be a change of drivers between the 15- and 17-minute marks and between the 30- and 32-minute marks. After the second driver change, drivers may swap places as often as they like.
- During all other Mains, there must be a change of drivers within two minutes of the announced halfway point. No other changes are permitted.

A-MAIN

The TQ team of McClosky and Langarica was quickly taken out of contention when they bumped wheels with the Aakre/Itoh team. The resulting damage required a lengthy pit stop.

The Aakre/Itoh team held the lead for the first few laps, but little more than five minutes into the race, Chris Walrod and Chris Moore (of 1/8-scale off-road fame) took the lead by a narrow margin. This surprised everyone because this team from Southern California had only one good 10-minute qualifying run and barely made the number-seven position (nearly two laps behind the TQ time).

After that, little changed in the top two slots, apart from a gradually increasing distance between the leading teams of Walrod/Moore and Aakre/Itoh. At the 35-minute mark, the Aakre/Itoh car died; after they restarted it, the team found that they were stuck with only first gear left in their 2-speed transmission. Following this mishap, the

"I would like to thank Mike Reedy for giving me...

...THE FASTEST MOTORS



Masami's Top Qualifying

RC10B3

Masami Hirose and Reedy Modifieds:

- Top Qualifier, 2WD • Top Qualifier, 4WD and IFMAR '97 4WD World Champion

REEDY Modifieds
18

Everybody Else
COMBINED:
9

KNOW THE REAL SCORE...

Reedy Modifieds have powered 18 World Champions...
More than all the other motor manufacturers combined!



First-place winners Chris Walrod and Chris Moore are given their tickets to Japan by Castle Hobbies employee Eric Vaughn (left) and Castle Hobbies owner Terry Scott (right).

Sponsored drivers aren't allowed to participate in the Kyosho World Cup. That's the

rule. But hey, who are those guys over there? Chris Moore and Chris Walrod? Don't they race for Team Kyosho? Is that allowed?

"Chris Walrod and Chris Moore are sponsored by Kyosho for 1/8-scale gas only and not for GP-10 racing ... they [are] allowed to compete for a trip provided by their sponsors."

The decision to allow the two sponsored drivers to race seemed unfair to the other racers who argued that the Kyosho series was designed to reward average racers who otherwise might not have the chance to compete on an international level. They felt that if sponsored drivers from other scale classes are allowed to compete, the event

Controversy in the pits

It was true, two Team Kyosho drivers were there to race. The controversy had to be dealt with, so an official Great Planes/Kyosho race representative was consulted. The decision came down:

becomes another pro-level race and leaves average "sport" racers out in the cold.

Whether or not Kyosho/Great Planes will stand by their interpretation of the rules in future events remains to be seen but, for now, Walrod and Moore are bound for Japan.

Walrod/Moore duo held the pedal to the metal, stretched their lead to more than four laps and breezed in to win with 220 laps in 60:16.33. Their trip to Japan was

in the bag!

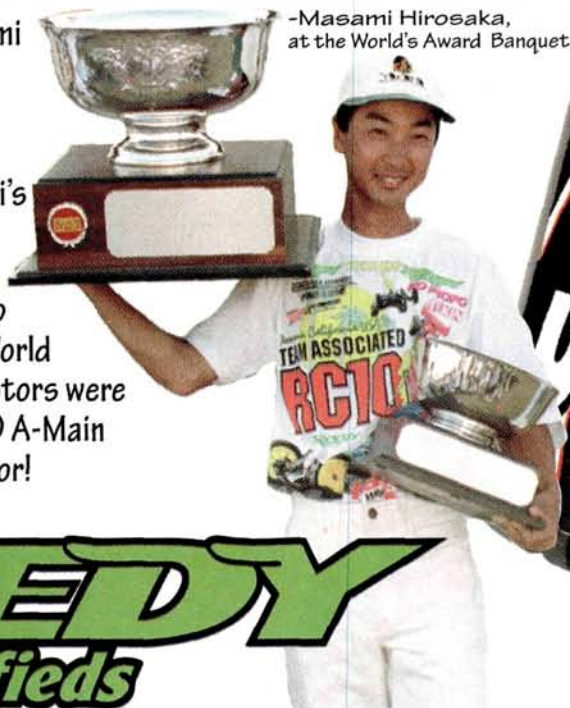
In second place were Aakre and Itoh, who had given it their all, but suffered from R/C gremlins. Third place went to

locals George Johnson and Michael Evert who had driven consistently throughout the event. Good job!

IN THE WORLDS!"

Reedy Modifieds powered Masami Hirose's new RC10B3 to Top Qualifier Honors, turning the FASTEST LAPS of any 2WD car. And, Reedy Motors took Masami's Yokomo MX4 to Top Qualifying Honors in 4WD before powering away from the rest of the field to capture the 1997 IFMAR 4WD World Championship! In fact, Reedy Motors were in twice as many cars in the 4WD A-Main as the next leading brand of motor!

-Masami Hirose, at the World's Award Banquet



REEDY Modifieds

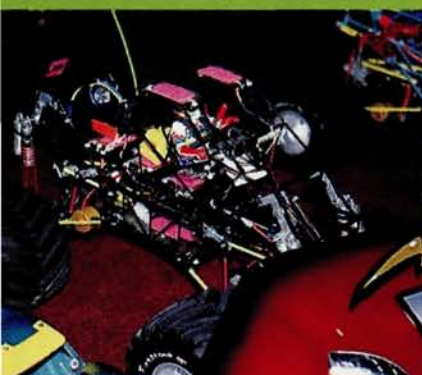
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◀ A lot of creativity went into these trucks. Here is a realistic Bear Foot monster truck (left), an immaculate Bennett rig (middle left) and this awesome tube-frame Clod (lower left).

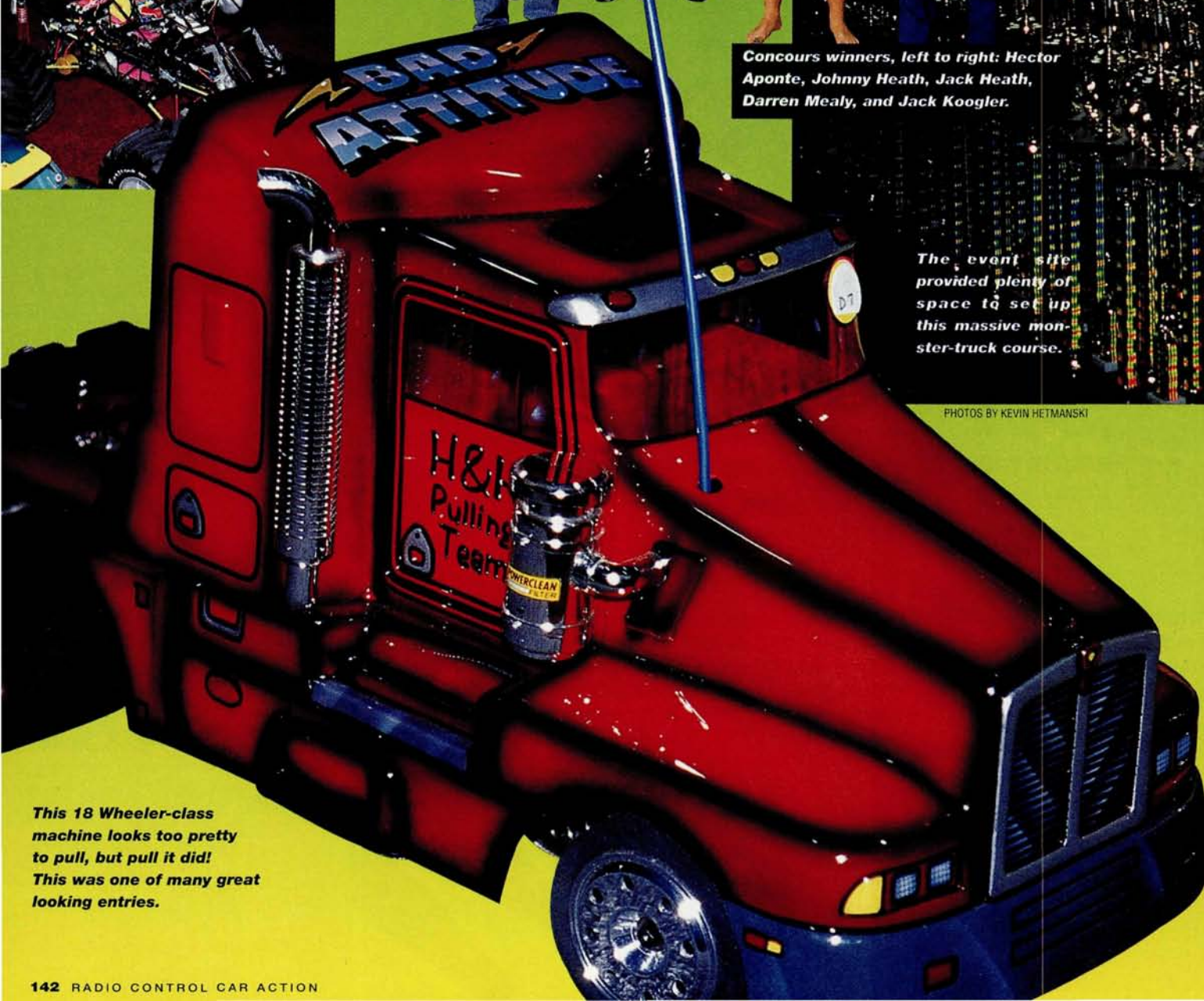
NR/CTPA Worlds



Concours winners, left to right: Hector Aponte, Johnny Heath, Jack Heath, Darren Mealy, and Jack Koogler.

The event site provided plenty of space to set up this massive monster-truck course.

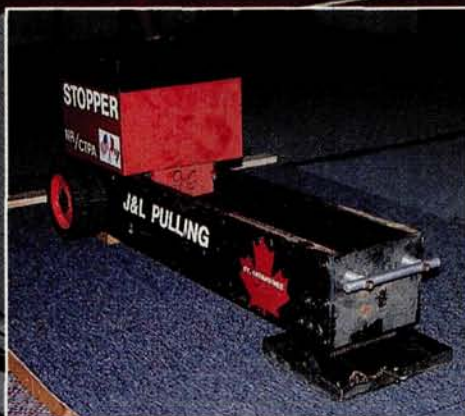
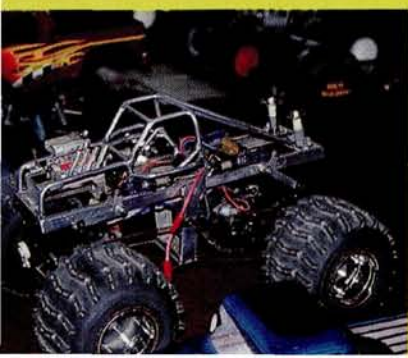
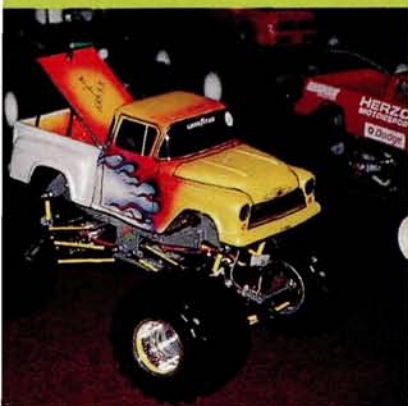
PHOTOS BY KEVIN HETMANSKI



This 18 Wheeler-class machine looks too pretty to pull, but pull it did! This was one of many great looking entries.

Traction Action and Monster Mayhem in Ohio

by Kevin Hetmanski



This is Jack Koogler's smoker tractor, the Silver Bullet. The driver's throttle hand and steering hand moved when the tractor's throttle and steering were used.

◀ Jack Koogler gets his tractor ready for a run down the track.

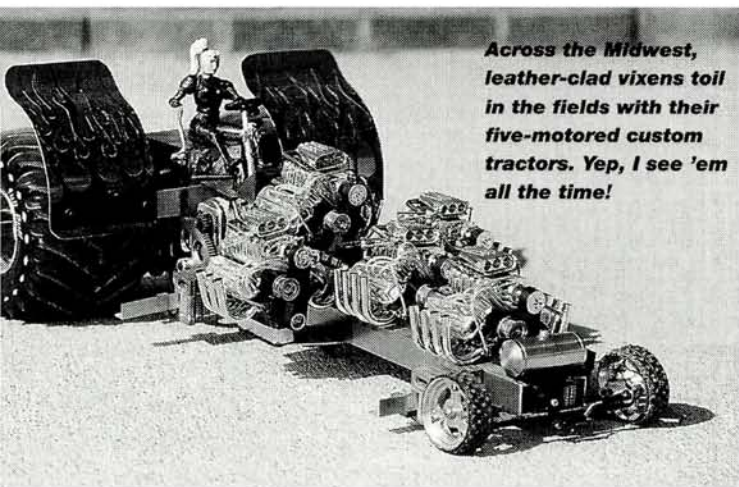
◀ Vintage style bodies were a popular motif.

◀ A lot of the trucks featured realistic tubular roll cages like this gleaming competitor.



The Holiday Inn Resort and Convention Center in Montpelier, OH, was the site of what could be billed as the "heaviest" event in R/C: the National Radio Controlled Truck Pulling Association's (NR/CTPA) ninth annual world championships. Two hundred and sixty-seven entries came from all over the United States and parts of Canada to compete for the title of world champion in several truck pulling and monster-truck categories. The weekend offered plenty of eye candy for truck and pulling buffs, as well as some serious competition!

Things got under way early Saturday morning. Registration was open to accept any last-minute entries, and all of the competitors displayed their vehicles on the atrium floor for the concours judging. After the concours judges had sorted their way through



Across the Midwest, leather-clad vixens toil in the fields with their five-motored custom tractors. Yep, I see 'em all the time!

the field of beautiful machines, it was time to get to the business of pulling and monster-truck competition. The monster-truck course was set up, the national anthem was played, and R/C truck history was about to be made.

TRUCK-PULL COURSE

This year, the truck pulling was held on three carpet tracks. One track was used for lightweight pullers, another for heavier classes and the third hosted the super heavyweights. There was also an indoor dirt track for the electric pullers as well as an outdoor dirt venue for gas pullers. With the action so spread out, it was somewhat difficult to keep track of what was going on without

cloning myself, but I managed to keep tabs on all the action.

MONSTER-TRUCK COURSE

A large obstacle course was set up on the floor of the atrium. Tape marked the rows where the trucks would make their pulls, and cones indicated the ends of the lanes. Jumps of various sizes were also used to keep the drivers on their toes.

The monster-truck competition was very scale, as the NR/CTPA uses a light system that is very similar to the type full-size monster trucks use to time runs. A beam of light is emitted by a photoelectric cell to serve as a starting line. When the front tires of the truck break the beam, the truck is "staged" and set to go. The driver watches the "Christmas tree"—a series of sequential lights such as those used in drag racing—and launches on the green light.

As with the pulling machines, certain rules apply. Each truck is inspected after every run to be certain it meets the specifications required by the NR/CTPA to compete in the class. The racers must also meet certain driving criteria: during the actual race, at least two truck tires must hit each jump, and if a jump is missed, 2 seconds are added to the total time. If a driver hits an orange cone, one second is added to his or her time. A DNF is given if the truck goes out of bounds. Competitors are given several chances at the course, and the best run is used to establish their qualifying position. In an interesting case of motorsports cross-pollination, several of the drivers in this year's contest are actually

Holy tons of monster trucks, Batman!



THE ULTIMATE PIT SP



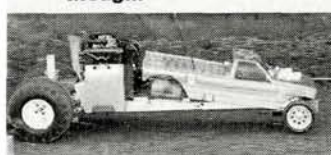
When you pull up the Team Serpent Network web site you pull into gas racing's ultimate pit space. Browse the on-line version of our 80-page, 200-photo Tech Book—a virtual gas car bible that puts 20 years of tuning know-how at your fingertips. Join the Cyber-Pit, a unique interactive web page where racers from around the world share tech information. Download our exclusive START datalogging software...for free. Or read the latest tuning tips in columns by the current World T.Q., the ROAR Champion, and other experts. TSN—get it dialed up, and get your car dialed in.



Drivers and pullers of all ages competed at this year's Worlds.



Even monster trucks flip over; there are no turn marshals here, though.



This is Larry Jacques' amazing gas-powered dirt puller. These pullers use weed-whacker motors to rocket them down the track.

Bolink Digger

- Stock motor.
- 6-cell maximum.
- Stock chassis.

Mini Rod

- Any non-cobalt 540 motor not exceeding a manufacturer's suggested list price of \$90.

- 8-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Rubber bar agricultural tread tires only.
- 7-pound weight maximum.

2WD Stock

- Non-adjustable-endbell stock motor only.
- 6-cells only permitted.
- Chassis, gearbox and suspension system must be original equipment from each specific vehicle.
- Any tire combination is permitted.

18-Wheeler

- Non-adjustable-endbell stock motor only permitted.
- 7-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Tires must be 4WD 1/10-scale, and all tires must be the same size.

2WD Superstock

- Non-adjustable-endbell stock motor only.
- 7-cell maximum.
- Chassis, gearbox and suspension system must be original equipment from each specific vehicle.
- Any tire combination is permitted.

Dual Motor Stock

- Non-adjustable-endbell stock motor only.

- 7-cell maximum.
- The chassis, gearbox and suspension system must be original equipment from each specific vehicle.
- Tires must be of the same size and stock for each specific vehicle.

Bar Tire Sportsman

- Non-adjustable-endbell stock motor only.
- 7-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Rubber agricultural tires only.

2WD Modified

- Any motor not exceeding manufacturer's suggested list price of \$90.
- 8-cell maximum.
- Chassis must be original factory or production replacement.
- Gearbox must be original or factory production replacement and must have no fewer than two internally driven gears in a sealed gearbox.
- Any tire combination is permitted.

Dual Motor Stock

- Non-adjustable-endbell stock motor only permitted; two-motor maximum.
- 7-cell maximum.
- Wheelbase must be original for each specific vehicle.
- Any tire combination is permitted.

Dual Motor Superstock

- Non-adjustable-endbell stock motor only; two-motor maximum.
- 14-cell maximum.
- Gearboxes and suspension must be original equipment for that vehicle.
- Wheelbase must be original for each specific vehicle.
- Any tire combination is permitted.

2WD Sportsman

- Non-adjustable-endbell stock motor only permitted.
- 7-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Any tire combination is permitted.

2WD/4WD Open I

- Any motor not exceeding manufacturer's suggested list price of \$90.
- 14-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Any tire combination is permitted.

Dual Motor Modified

- Any motor not exceeding manufacturer's suggested list price of \$90; two motor maximum.
- 14-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Any tire combination is permitted.

Dual Motor Modified

- Any motor not exceeding manufacturer's suggested list price of \$90; two motor maximum.
- 14-cell maximum.
- Original or factory production replacement gearbox for each specific vehicle.
- Any tire combination is permitted.

2WD/4WD Open II

- Motor must be approved by the NR/CTPA, including: Fine Design; Astroflight Pullmaster III, Pullmaster IV, 25, 40, Sport 60 and 60; and Graupner.
- 28-cell maximum.
- Chassis may be scratch-built or a combination of kit components.
- Any tire combination is permitted.

CE IS IN CYBERSPACE



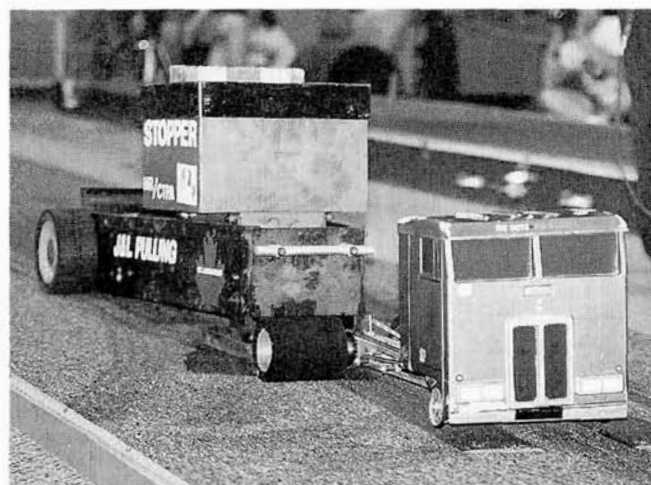
www.serpent.nl



EXCITEMENT IN THE FAST LANE

sponsored by full-size monster truck owners.

The NR/CTPA Worlds is over for this year, and I think it's safe to say that everyone had a great time. At the event were many creative people who built and detailed custom trucks that looked and ran really well. Everyone associated with running the event was extremely kind and helpful and offered advice on setups to racers and to any-



Sure it's silly looking, but it can pull more than 500 pounds without breaking a sweat. The tires actually smoke as the load is increased!

one interested in becoming involved with the sport. With so many classes to choose from, it's a great way to see R/C trucking for the first time. If you ever have a chance to attend an NR/CTPA event, I suggest that you check it out.



Al Fowler's massive Clod Buster, Bulldog, has three gear-boxes, a Sassy Chassis aluminum Clod chassis, three Pullmaster motors, 4:1 gear reductions, a full set of steel gears and 28 cells to get it moving. Al is a member of "Clods for Kids," an organization whose members travel to fairs, car shows and Boy Scout events to demonstrate the trucks for children. What a great way to get kids involved in the R/C hobby!

Everyone involved with the NR/CTPA Worlds would like to thank the event's generous sponsors: Airtronics, Badboys R/C Pullers, Bolink, Boca Bearings, Borderline Pullers, Bennett Equipment, Du-Bro, County Line Pullers, Futaba, B&T Batteries, Hooter Chassis, Traxxas, Monsters & Sled Dragons, Novak, Ramsey's Hobbies, R/C Car Action, Robinson Racing, Radio Controlled Models, Tekin, Weight Pullers of C.N.Y., Paragon Racing and Great Planes. ■

NR/CTPA WORLDS WINNERS

MONSTER TRUCK

Pos.	Driver	Time
Stock		
1	Dave Wright	38.008
2	Rob Choinski	47.717

4WD Stock

1	Freddie Privett	35.704
2	Ron Phenice	39.456
3	Ron Phenice	40.470

2WD Mod

1	Shelby Estell	34.010
2	Wyman Wade	36.964
3	Shelby Estell	37.372

4WD Mod

1	Tim Powers	32.099
2	Freddie Privett	32.243
3	Tim Powers	32.837

Super Stock

1	Ryan Ross	29.247
2	Freddie Privett	30.015
3	Justin Sanders	36.302

Open Race Truck

1	Billy Herzog	28.807
2	Freddie Privett	30.141
3	Kyle Hubert	—

TRUCK PULL

Carpet

Pos.	Name	Distance
Digger—25 pounds		

1	Johnny Heath	23 ft., 7 in.
2	Michael Gross	19 ft., 2 in.
3	Bud Woodruff	16 ft., 11 in.

Dual Motor Box Stock—90 pounds

1	Frank Kaipinski	19 ft., 9 in.
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2WD Stock—65 pounds

1	Joe Killian	FP*
2	Lil Robert	29 ft., 7 in.
3	Tina Bonar	26 ft., 7 in.

Mini Rod—75 pounds

1	Jack Koogler	FP
2	Anthony Brotherson	23 ft., 7 in.
3	Darrel Brotherson	23 ft., 5 in.

18-Wheeler—90 pounds

1	Bob Ridgeway	23 ft., 11 in.
2	Bob Ridgeway	21 ft., 7 in.
3	Donnie Franklin	21 ft., 5 in.

2WD Superstock—90 pounds

1	Harry Wagner	14 ft., 9 ³ / ₁₆ in.
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Pro Stock—20.5 pounds

1	Joe Killian	24 ft., 10 in.
2	Jack Koogler	21 ft., 6 in.
3	Glen Singleton	14 ft., 5 in.

Bar Tire Sportsman—154 pounds

1	Bud Woodruff	23 ft., 7 in.
2	Ken Rice	22 ft., 7 in.
3	Terry Jacobus	22 ft., 7 ¹ / ₈ in.

4WD Dual Motor Stock—176.5 pounds

1	Carol Queen	24 ft., 9 in.
2	Matt Wilkins	24 ft., 8 in.
3	Bob Helm	24 ft., 6 in.

2WD Sportsman—269.5 pounds

1	Jon Lehmon	24 ft., 4 in.
2	Dave Wright	24 ft., 4 in.
3	Brad Rudolph	24 ft., 3 ³ / ₄ in.

2WD Open I—332 pounds

1	Kenny Potts	24 ft., 8 in.
2	Johnny Heath	24 ft., 6 in.
3	Jack Koogler	24 ft., 1 in.

4WD Open I—357 pounds

1	Jack Koogler	23 ft., 1 in.
2	Johnny Heath	23 ft.
3	Dave Queen	21 ft., 2 in.

Dual Motor Modified—421 pounds

1	Jack Koogler	24 ft., 6 in.
2	Brad Pitt	24 ft., 1 ¹ / ₈ in.
3	Carol Queen	23 ft., 5 in.

2WD Open II—580 pounds

1	Bob Ridgeway	26 ft., 5 ¹ / ₁₆ in.
2	Jack Koogler	25 ft., 5 ⁷ / ₈ in.
3	Dave Wright	24 ft., 8 ⁹ / ₁₆ in.

4WD Open II—527 pounds

1	Dave Queen	19 ft., 5 in.
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Dirt

Digger—11 pounds

1	James Guinta	25 ft., 3 in.
2	Joe Neiman	23 ft., 5 in.
3	Ron Phenice	22 ft., 5 in.

18-Wheeler—39 pounds

1	Bud Woodruff	FP
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Mini Rod—39 pounds

1	Vince Nelson	29 ft., 11 in.
2	Ken Rice	29 ft., 5 in.
3	Larry Jacques	28 ft., 8 in.

Smoker—50 pounds

1	John Neiman	27 ft., 1 ¹ / ₂ in.
2	Joe Neiman	25 ft., 11 in.
3	Ron Phenice	24 ft., 8 in.

2WD Super Stock—42 pounds

1	James Guinta	FP
2	Joe Killian	27 ft., 3 in.

4WD Dual Motor Stock—60 pounds

1	James Guinta	FP
2	Dave Hills	28 ft., 6 in.
3	Brad Pitt	24 ft., 9 in.

2WD Sportsman—60 pounds

1	Don Hubert	28 ft., 3 in.
2	Larry Jacques	27 ft., 3 in.
3	Tina Bonar	26 ft., 9 ³ / ₈ in.

2WD Open I—90 pounds

1	Dave Engle	25 ft., 11 in.
2	Dave Hills	24 ft., 6 in.
3	Larry Jacques	23 ft., 5 in.

4WD Open I—38 pounds

1	Mike Dozier	23 ft., 1 ¹ / ₄ in.
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Dual Motor Modified—115 pounds

1	Larry Jacques	23 ft., 8 in.
2	Ramsey Segovia	22 ft., 4 in.
3	Nate Briggs	20 ft., 2 in.

2WD Open II—120 pounds

1	Darren Mealy	FP
2	Darren Mealy	29 ft., 4 in.

Gas—125 pounds

1	Joe Killian	FP
2	Larry Jacques	22 ft., 10 in.

*FP= full pull

racing

From the track to the parking lot.
This is the R/C action as **you** see it.

This is YOUR PAGE!

That's what "Grassroots" means—from the roots—the ground up; and that means **YOU!**—real, live R/C'ers—readers—an entire page of your stuff! Show the world—yes, everywhere from here to there—what you and your R/C friends are doing. Wanna brag? Here's the spot. Go on; show us!

Send photos with captions to "Grassroots Racing," Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606.

call now!

Whether you're a dealer or just a bunch of fun-lovers in search of a race program, call now! Here are a few hot-line numbers to call if you have any questions, or if you'd like to start a program in your area.

Bolink Legend Series
(404) 963-0252

Tamiya R/C Championship Series
(800) TAMIYA-A

Kyosho R/C Sport Racing
(800) 682-8948 ext. 085F

Hobby Shack Parking Lot
(714) 964-8846

Hobby Town USA Parking Lot
(402) 434-5050

Trinity Street Spec Series
(908) 862-1705

Live from the Pit

The approximately 30 to 35 participants who attend races on Sundays are described as a "classic mixed bag of skill levels and cars [who] all seem to have a good time." Here two race participants ready their cars with Blue Thunder fuel and some car maintenance in between heats.

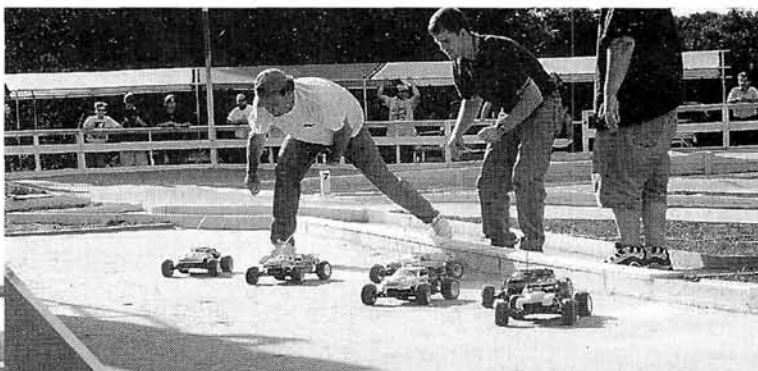


Joe Stagge, owner of the Pit Row Hobby Shop in Cincinnati, OH, arranges for weekly parking lot races in the parking lot of a local Office Max. Asphalt, sandbags, PVC piping and Tamiya turn plates lay the groundwork for a track which varies from week to week to keep races interesting enough to attract "a few" spectators.

All in the Family

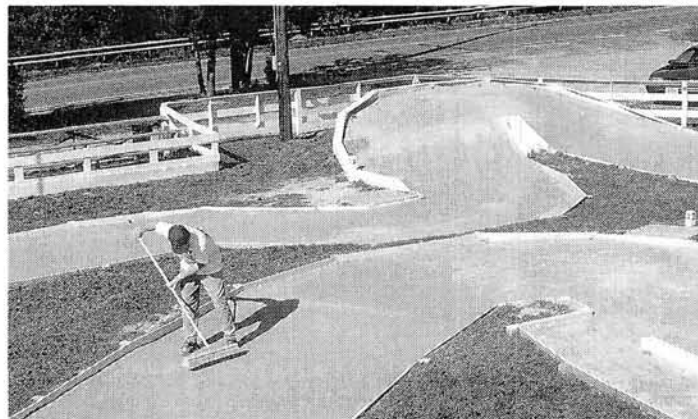
To the 50 racers in Vineland, NJ, who call Family Hobbies "home," it's no wonder at all how the place came by its name. In fact, the atmosphere there is so friendly that the racers who gather on Saturday nights to actually share tips and secrets to help one another cross the finish line first.

As it has everywhere else, gas racing has boomed back on the scene here; the gas-truck population has doubled since last season. During any week, between 20 and 30 gas racers tear up the track in a cloud of nitro smoke!



R/C'ers from all over the East Coast will go the distance to visit Family Hobbies: Lou Fusco (left) drove two hours from his home in Woodland, PA, on a Thursday night to pick up his new baby ... and boy, did it deliver! Lou's brand-new Associated T3 was the fastest truck on the track and took TQ honors. After the first heat, Lou commented, "This thing hauls; I love it!"

Track owner and groomer Ron Boreman Sr. gets out the broom before the qualifiers begin. Racers who meet regularly at Family Hobbies say it's one of the best-kept facilities they've ever visited. Ron's usual response: "Keep out of my way!" From the looks of the track's fine clay and great layout, drivers must find new ways around it whenever they visit.





(TCS) #40

Tamiya's Championship Series

Seventy-six racers turned up for TCS #40 hosted by Galaxy Hobby in Lynwood, WA, to compete in six classes; 25 racers had second entries.

Winners

F1

1	Jesse Morales
2	Rich Mishko
3	Ray Meek
Best of show	Jose Morales
Top rookie	Steven Olmstead
TQ	Jose Morales

FWD Sedan

1	Ty Follis
2	Jeff Murrell
3	Dale Van Wyk
Best of show	Les Smith
TQ	Ty Follis

4WD Sedan

1	Brett Sisley
2	Scott Nelson
3	Ty Follis
Best of show	Scott Norton
TQ	Brett Sisley

Indy Spec

1	Andy Sharples
2	Paul Hamilton
3	Eric Lee
Best of show	Andy Sharples
TQ	Andy Sharples

4x4 Truck

1	Jon McLean
2	Jeff Olmstead
3	Spenser Wilson
Best of Show	Brian Holton
Top Rookie	Spenser Wilson
TQ	Jon McLean

Mini Sports

1	Dale Van Wyk
2	Sean Williams
3	Rebecca Renado
Best of show	Dale Van Wyk
Top Rookie	Richard Shaw
TQ	Dale Van Wyk



Bring oval racing to a mall near you

OK, you say your excuse is that you don't have a track near you, right? Well, there are no excuses now, my friend, thanks to Micro Reality Racing. They recently sent us this picture of their portable, 30x16-foot, banked oval track. If the track proves to be popular at its first display at the Glen Burnie Mall in Glen Burnie, MD, its owners plan to demonstrate it at fairs, festivals and other similar events. The relatively small track is perfect for 1/10-scale and smaller cars and is used for play, rather than all-out racing. It seems to us, though, that it's a great way to bring R/C to places where it's otherwise inaccessible. For more information, contact Micro Reality Racing at (410) 761-6196.



LAST RACE WINNERS

Spec classes

A-main: Mike Beach
B-main: Steve LaDuke
C-main: Vothana Song

Modified Buggy

A-main: Dave Moyes
B-main: Dan Atton

Gas Truck

A-main: Tim VanBlaircom

Always Expanding

After a great season, Dave Moyes of Jon's Hobbies in Mt. Pleasant, MI, plans on spending the off-season expanding the track. With races running in Spec, Modified Buggy, Modified Truck and Gas Truck classes, the new larger track will hopefully draw even bigger crowds next season!

Servo SHOOT Tape

by Rick Eyrich

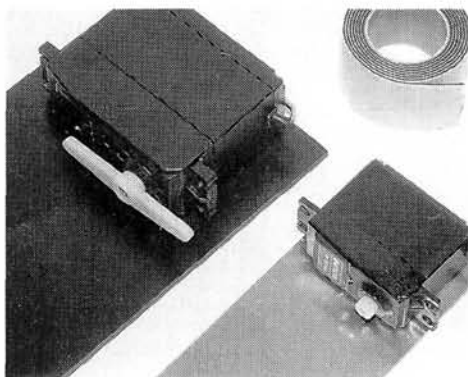
S T I C K

HAVE YOU EVER wanted to determine how serious an R/C car fanatic/enthusiast you've become? Here's a simple test: are there any scrap pieces of servo tape stuck to the soles of your shoes, car mats, or house carpeting? One out of three makes you an intermediate enthusiast; two shows you're a semi-pro, and all three gets you a gold star of fanaticism. Find tape anywhere else—family pets, ceiling, etc.—and you rate “get a life” status!

Seriously, my point is that double-sided servo tape is *vital* for anyone who messes with R/C cars. And to help you decide which brand might be best for your vehicles, I “stressed out” nine brands of tape—from Bolink*, Du-Bro*, Great Planes*, MIP*, Sonic-Tronics*, Team Losi*, Trinity*, RadioShack and Scotch/3M. I checked the last two brands to evaluate tape that wasn't designed specifically for R/C because some folks have to rely on it when there isn't a local hobby shop.



I tested seven hobby brands of tape and two other types. I used them to mount a standard and a large-scale servo on two types of surfaces—aluminum and Kydex.



Kydex and aluminum plates were the test surfaces. Kydex represented a plastic chassis; aluminum represented the metal frames found on many nitro R/C vehicles.

TORTURE TECHNIQUES

I checked the tape's adhesion to Kydex and aluminum. The Kydex represented composite surfaces, and the aluminum, any and all metal-chassis setups. I used each type of tape to mount Hitec and Futaba servos, prepping the servos and the surfaces before testing each product.

I first cleaned the surfaces with regular denatured alcohol, and I also scrubbed the aluminum with a Scotch-Brite pad. Between tests, I stripped and cleaned the servos and surfaces thoroughly to ensure that all the tapes tested had the same surfaces to stick to.

Equal lengths of tape went on both servos. The mated surfaces were allowed to set for one hour, checked, placed in the refrigerator for an hour, checked again and then allowed to return to room temperature and given a 2-minute blast with a hair dryer. The cold test simulated cooler weather, and the heat test simulated the heat generated by the ESCs, batteries and nitro engines that many R/C cars must withstand.

Finally, I removed the servos to see how tough cleanup was for each tape. Here are my results. I scored the tapes on a scale of zero to 10, the maximum score meaning that it just couldn't get any better than that!

BOLINK BL-1857 Stik It

This performed very well. Its “sticktion” rated an excellent on the Kydex and a nearly excellent on the aluminum. Flexing was minimal on both plates, and cooling made the tape hold tighter. Heat didn't alter its adhesion, and cleanup was fairly simple with the aforementioned alcohol.

■ Score: 9

DU-BRO 634 Double Side Tape

Available in a pack containing 1/32-, 1/16- and 1/8-inch thicknesses, this product gripped both test surfaces adequately with only a little too much flexibility. The cold check didn't affect it at all, but on the aluminum test plate, the heat did loosen the tape somewhat. The tape should work well on any receiver/ESC and low-torque servo installation. The only minus was cleanup—messy!

■ Score: 7

GREAT PLANES GPMQ4442 Foam Tape

The 1-inch-wide tape stuck to both surfaces equally well—almost no hint of servo movement. Cold didn't alter the tape's effectiveness, but heat did. After two minutes of heat torture, the servos came off both test plates. I'd avoid using this tape around nitro engines or DC heat; cleanup was also kinda yucky.

■ Score: 6

MIP MXT-I Super Servo Tape

Initial adhesion to the aluminum/Kydex was excellent. This ultra-thin tape had a different feel, and there was virtually no flexing during the cold/heat tests. The package says “bonds like glue” (it does) and that it can “... be peeled off in one piece with one pull.” This really interested me! And yes, it did peel off as claimed and didn't leave any residue. The only downside was that it stuck too well! You have to pry your servo free carefully to avoid damaging its case.

■ Score: 10

OUT IT!

SONICTRONICS 234 Mounting Patches

These 1x1½-inch pieces held fast, and there was very little servo movement. But like the Great Planes tape, it wasn't happy around heat; and on the aluminum, it completely gave up during the hair-dryer action. The Kydex/servo combo stayed together, but the heat-softened tape stayed mushy until it cooled to room temperature.

■ Score: 6

TEAM LOSI A-4004 Servo Tape

This servo tape showed minor flexing, but heat and cold barely affected it at all—just some loosening from the aluminum, but it was only slight. Cleanup was slow.

■ Score: 8

TRINITY 6001 Servo Tape

Nothing stuck better to the test surfaces and servos. It held fast and shrugged off the temperature extremes to which I subjected it. The only downer was how *hard* I had to work to separate the servos and the test surfaces! Other than that, the Trinity tape finished on top along with MIP's servo tape.

■ Score: 10

RADIOSHACK 64-2361 Super Mount Tape

Many might dismiss this tape, but it made a good R/C car crossover—good grip, low flex and didn't get gooey or loose during the temperature tests. It was also fairly easy to remove.

■ Score: 8

SCOTCH/3M 111 HD Mounting Squares

These readily available tape squares held tight to both plates and didn't fail their final exams of heat and cold! In a pinch, this brand will suffice for most R/C car work.

■ Score: 7

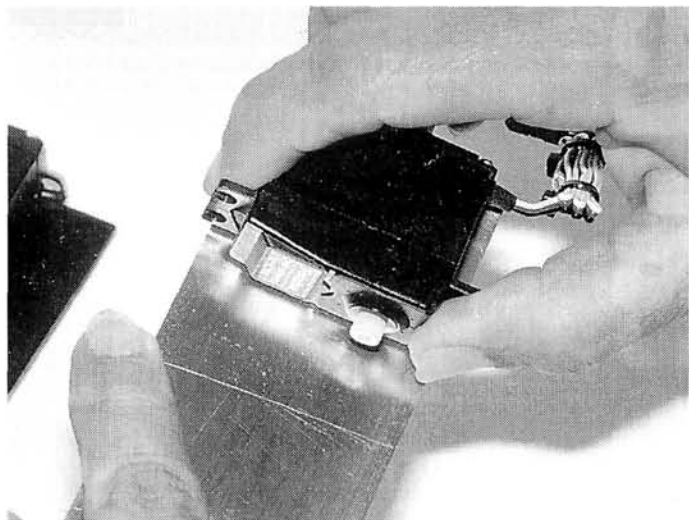
THE VERDICT

Most of the tapes worked well enough for most R/C car work. Your choice should depend on which R/C vehicle you own; use this guide to "pick and stick" your radio gear quickly and easily.

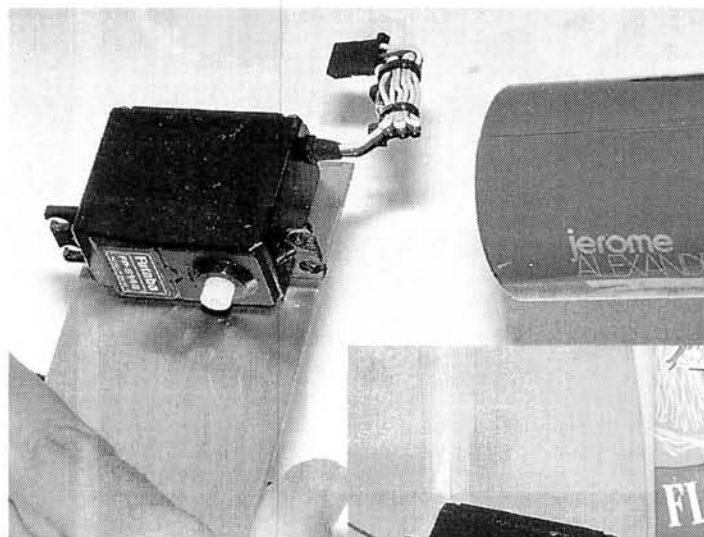


Above: before the tape was applied, the surfaces were thoroughly cleaned with denatured alcohol. The aluminum was also well-scuffed with a Scotch-Brite pad.

Right: after an hour of "sticking time," the servos were checked for grip and flexing. All the tapes remained tight at this point, but there was more to come!



Left: every test tape/surface/servo combo was given a 2-minute blast with a hair dryer set on high. Three of the tapes loosened or failed completely during this; don't use them anywhere near a nitro car's powerplant.

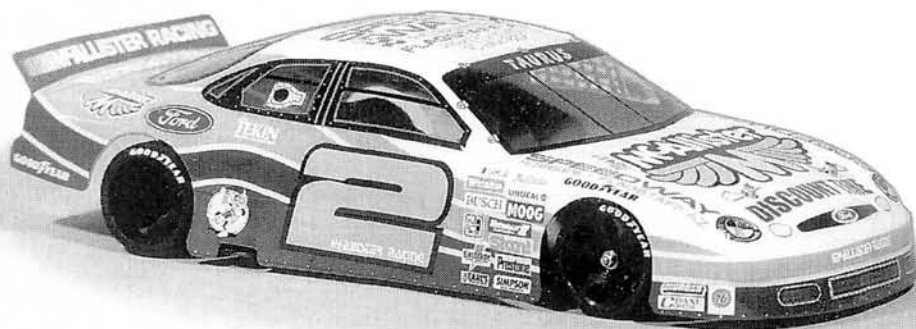


Right inside the fridge, the tapes were all subjected to winter's icy blast! Most held even tighter during this test—good stuff!



**Addresses are listed alphabetically in the Index of Manufacturers on page 193.*

WHAT'S new



McALLISTER RACING

'98 NASCAR Taurus

This great new '98 NASCAR Taurus body offers true scale realism, great fit and fantastic detail work. It's already a proven winner at its home track in Arizona!

Part no.—B178; price—\$19.99.

McAllister Racing, 2710N Steves Blvd., #8, Flagstaff, AZ 86004; (520) 714-1644; fax (520) 714-1655.

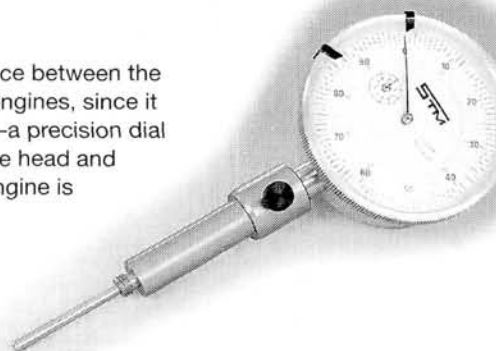
DYNAMITE

Deck Clearance Gauge

Until now, it has been difficult for racers to check deck clearance (the distance between the top of the piston and the head, with the piston at top dead center) on their engines, since it involved technically tricky and expensive tools. This deck clearance gauge—a precision dial indicator with a machined aluminum adapter—attaches directly to the engine head and gives accurate measurements. Its readings will help you determine if your engine is wearing out or needs adjusting.

Part no.—DYN2600; price—\$39.95.

Dynamite; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355.



DURATRAX

Streak ESC

The new Streak speed control offers uncompromised performance at budget cost. It is a forward-only unit that's designed for hot stock or modified motors with no fewer than 12 turns, and it features ultra-high-frequency operation for great response timing and maximum battery run time. It also offers ABS braking, one-button model setup operation, a traction control function, solid-state MOSFET transistors and reverse voltage protection. The Streak is available in two versions for compatibility with Futaba J and Sanwa/Airtronics connectors.

Part nos.—DTXM1030 (Futaba J), DTXM1031 (Sanwa/Airtronics); price—\$79.99.

Duratrax; distributed by Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826; (217) 398-6300; fax (217) 398-0008.

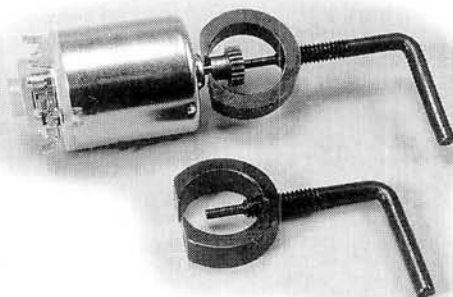
BOLINK

Gear Puller

This precision puller was designed to pull gears from motor shafts when the set screw is stripped and cannot otherwise be removed.

Part no. BL-6014; price—\$9.95.

Bolink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30045; (770) 963-0252; fax (770) 963-7334.



HPI RACING

Ford F150 Street Truck Body

The 1997 Ford F150 body is now available from HPI for all wide touring cars and popular super-speedway oval cars. The body comes complete with a rear spoiler and decal sheet for all the lights, window lines and official Ford F150 logos.

Part no.—7051; price—\$22.

HPI Racing, 15321 Barranca Pkwy., Irvine, CA 92618; (714) 753-1099; fax (714) 753-1098.



TAMIYA

Mitsubishi Lancer

Tamiya's 1/10-scale model of the Mitsubishi Lancer Evolution IV was designed to resemble—in looks and performance—its full-size rally car sibling, which appeared all over the rally racing circuit in 1997. The Lancer uses highly acclaimed, TA03F belt-driven, 4WD chassis mechanics, and its power is derived from a front-mounted 540 motor. It also has four-wheel, independent, double-wishbone suspension that is damped with coil-over, oil-filled shocks. The vacuum-formed polycarbonate body shell measures up to Tamiya's usual high standards, and the kit includes separately molded plastic door mirrors, an air scoop on the roof and a huge rear spoiler. One-piece, 5-spoke wheels are mated with semi-pneumatic treaded tires to complete the package.

Part no.—51899; price—\$267.

Tamiya America, 2 Orion, Aliso Viejo, CA 92656; (800) TAMIYA-A; fax (714) 362-2250.



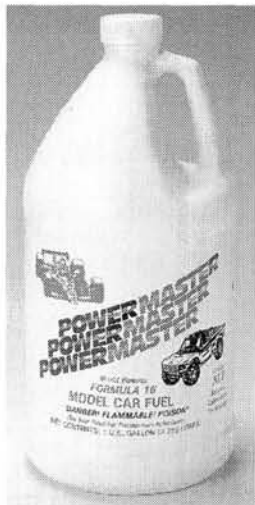
POWER MASTER

Engine Fuel

This new Formula 16 brand of nitro fuel is specially formulated to make your R/C car run smoothly. Available in blends of 20, 25, 30 and 40 percent, Formula 16's powerful fuels are designed to decrease engine wear.

Part no.—POWF-16; price—\$16.50 to \$20.50 per gallon (price varies with content).

Power Master; distributed by GBG Industries Inc., Hwy. 95, P.O. Box 650, Elgin, TX 78621; (512) 285-9595; fax (512) 285-9400.



BRP

1/18-scale Super Oval Outlaws

The latest update of BRP's Super Oval Outlaw comes in a very small size to make running more convenient. The updated kit includes a new rear aluminum heat sink pod plate with rear axle bushings to give you a smoother-running car. Kits also come complete with a clear body, mounted and trued tires and a high-performance motor. All that's needed to get this small-scale oval going is standard radio equipment and a 4-, 5-, or 6-cell AA Ni-Cd battery pack.

Part nos.—120 (super truck), 121 (stock truck) and 130 (Mercedes touring car); price—\$79.95.

BRP Inc., 1575 Lowell St., Elyria, OH 44035; (440) 284-0270; fax (440) 284-0271.



HITEC

HS-300BB Servo

Hitec has recently improved on its best-selling HS-300 servo with the addition of a top ball bearing. Packaged for individual sale or to accompany the Lynx FM pistol-grip radio system, this

servo can handle the load for throttle and steering on most popular cars and trucks. Like all Hitec products, the HS-300BB comes with a one-year warranty and is available with multiple connector choices.

Part no.—31305; price—\$20.95.

Hitec, 10729 Wheatlands Ave., Ste. C, Santee, CA 92071; (619) 258-4940; fax (619) 449-1002.



NITRO POWER

Batteries

This complete line of batteries in a full range of 13 sizes and amperages is a perfect match for your R/C car's needs. Rechargeable up to 1,000 times, these batteries are available in 4.8, 6.0, 7.2 and 9.6 volts and offer improved capacity and performance.

Contact Saft America for part nos. and pricing information.

Nitro Power Batteries; distributed by Saft America Inc., 2155 Paseo de las Americas #31, San Diego, CA 92173; (619) 661-7992; fax (619) 661-5096.



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This is my page—mine! The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. My Internet address is: chrisc@airage.com.

Foul-Weather Fun

Chris's

B

A

C

K

L

O

T

by
Chris
Chianelli

Dear Chianelli!

Our introduction to R/C track building was the result of a few of us having R/C cars, but no place to play with them. We made our first attempt without ever having seen an R/C track ... it was a nightmare!

As you can see from the photos, the second attempt went very well; it just took many wheelbarrows of dirt and a lot of raking!

For those in California and other sun-blessed states, you don't know how good you have it. In photos (right), you can see my son Kevin and me standing in a blizzard and realizing that our "blue-groove" problems were quickly being replaced by "white-groove" problems. Though Pro-Line's Bow Ties are OK, nothing hooks up in the white stuff the way it does in the dirt. Maybe Pro-Line or Losi will dream up some high-bite studded compound for us racers who live in the great white North.

The track is named Beech Raceway, and we'd like to thank Team Losi, Novak and Tekin for donating banners; we display them with pride (except when it snows!). We are located just outside Orangeville, about an hour north of Toronto, Ontario, Canada.

Thanks,

Howard P. Buck

Howard, wait!

I've got it! With names like Beech and Orangeville, you guys can warm yourselves up by imagining very hard that you're really in Florida, instead of Canada. Yeah, that's it! That's the ticket—mind over matter! Let me know if my brilliant plan works!

Seriously, you guys set a great example. You created your own place to race when there was none. (You will be receiving a one-year, free subscription to *R/C Car Action* for your resourcefulness.) I get many letters and emails from racers in Canada who are looking for a place to race; I hope my putting you in the

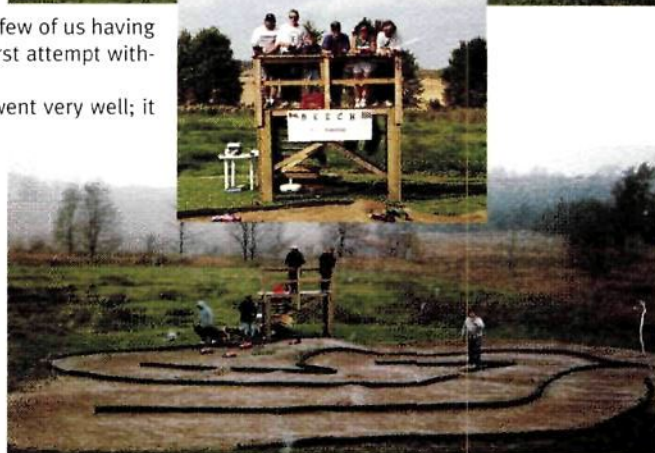


"Back Lot" hooks you up with racers in your area.

By the way, Howard, though the vehicles don't go as fast and the driving technique is different, monster truck racing in the snow (4WD or 2WD) is awesome fun.

Do the important thing; have fun. CC

For those wishing to contact Beech Raceway, write to: Orangeville Opticians, 150 First St., Orangeville, Ontario, Canada L4W3T7; Attn: Beech R/C.



Some views from
the brilliance
ever present on
the Internet

Hello Chris,

How are you? OK, let me get to my questions. As you already know, winter is here, and there is snow everywhere—and snow becomes water. Is there a way for me to protect my Tamiya Mercedes (TA02) from the elements? 'Cause I love the sport so much that I don't want to let the weather get in my way. And yes, I know you always emphasized that water and electronics don't mix. Besides using a balloon for the receiver, is there a way to protect the whole chassis from the snow?

Thank you for your time, and keep up the good work!

Billy Cheng

cheng1@server.uwindsor.ca

I'm fine, Billy! How are you?

Although you do not want to run any car through or too close to a puddle—slushy or otherwise—a chassis that has been dampened by fresh water isn't really a problem. Don't, however, store a still-damp car; dry everything off with paper towels and a hair dryer before you put your car away. The real enemy to be avoided is saltwater. Any electrolytic solution will devastate electronics. If the roads in your area are salted after a snowstorm, *do not* run your cars on them! Some states have outlawed salt because of the damage it does to cars and to the environment, and only sand may be used to treat the roads. Sand is obviously less of a threat to your car's electronics than salt.

But Billy, in the winter months, I recommend running a stadium truck or a monster truck, rather than a car like a TA02.

Thanks for your support.

CC